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West Europe Report

SCIENCE AND TECHNOLOGY

No. 170

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WEST EUROPE REPORT

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CONTENTS

SCIENTIFIC AND INDUSTRIAL POLICY

TECHNOLOGY TRANSFER

BRITISH INVENT NEW METALLIC MATERIAL SYALON, SEEK BUYERS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
7 Nov 83 p 7

[Article: "British Seek Customers for Syalon"]

[Text] J. Rh. London 6 November. The British inventors and manufacturers of "Syalon" are attempting to open up new areas of application for the new material. They are urging the [British] matalworking industry not to miss the opportunity of getting on board and particularly not to give the advantage of an early start to the Americans and Japanese. In the United States, the machine tool builder Kennametal has obtained a license for the material; in Japan, various companies of the Hitachi concern and the Mitsubishi Group; in Sweden, Sandvik.

Lucas Industries, the big manufacturer of electrical and other auto parts, and the Cockson Group, which is engaged in metal refining and smelting as well as pigment production, have formed a joint venture for evaluating the invention. Lucas developed the initial pilot plant; sometime later Anzon, a member of the Cockson Group, set up a larger production facility in Newcastle on Tyne. The Cockson-Lucas joint venture company for evaluating the material is called Lucas Cockson Syalon, Ltd. Presently in Newcastle, production amounts to tons per month; however, it is believed that thousands of tons per month can be produced toward the end of the century. The principal industries using the material at present are the aeronautics and space and the automotive industries.

Syalon is a compound of silicon, aluminum, oxygen and nitrogen. According to the manufacturer, it is as hard as diamond, strong as steel and light as aluminum--in short, the material of the future. It will replace metals mainly where low weight and high heat resistance are required, particularly in gas turbines and in internal combustion engines in whose design even higher temperatures than in the past are being considered. Fuel consumption, noise and pollution can be reduced by using Syalon. Depending on the proportions of the individual elements, the compound can be formulated so that it possesses specific properties to a greater or lesser degree. With the presently small quantities, production costs are of course still high; however, even at this time, price competition is possible with expensive nickel compounds, for instance. With increasing production quantities, the price will decrease; and, in addition, it will one day be possible to fall back on raw materials which are available in large quantities at low prices: clay, coal and nitrogen.

9160
CSO: 3698/124

BRIEFS

SWEDISH 'SPACELAB' METALLURGY EXPERIMENT--There is actually a small Swedish experiment on board Spacelab. It is a little lump of 224 grams of tin and aluminum. Some time during the flight someone will push a button which starts one of the small smelting furnaces on board. At 630 degrees C. the oven will turn off. Then Professor Hasse Fredriksson at Stockholm Technical University will be pleased. For then he will finally get a little smelting which has hardened in a weightless condition. That can give metallurgists in Stockholm new ideas about what controls the solidification of metals. This time Hasse Fredriksson's experiment is flying in space gratis through special agreement. Next time the same thing will cost 10,000 dollars. [Text] [Stockholm NY TEKNIK in Swedish 10 Nov 83 p 74] 9287

CSO: 3698/135

BELGIUM'S SPACE BUDGET, RESEARCH, PARTICIPATION IN ESA

Brussels LE SOIR in French 5/6 Nov 83 p 5

[Unsigned article in the column "Space and Us": "For Our Manufacturers and Researchers, Space Has Become an Adventure"]

> [Text] "We're not going into space for space's sake": This phrase was recently pronounced by Mr Philippe Maystadt, minister of Scientific Policy, before the Scientific Journalists" Group during a conference the object of which was to restore Belgium's place in the space concert of nations. What does it mean? Above all, that we are trying to be efficient rather than playing the frog who wanted to make itself as big as the bull. It would be ridiculous to want a small country like ours to build rockets, but nothing is stopping our most prominent industries from manufacturing one or another component and nothing is stopping our researchers from carrying out original projects which cannot be brought to a successful conclusion on our soil.

What the public knows most about our space activity has to do, of course, with the Lessive and Redu stations, two Ardennes localities which host, respectively, a telecommunications station which makes abundant use of satellites, and a satellite tracking station whose mission is to track and supervise the flight of these odd machines.

But in fact this activity in space is relatively minor when compared with our industrial participation and our scientific collaboration. The latter pass almost exclusively through the channel of the European Space Agency (ESA), an organism created in 1975 on the ashes of Eldo and Esro [expansions unknown]. Although the two latter organizations had only the disappointments of the Rueopa rockets on their debit side, ESA has something big on its credit side: the Ariane rocket, which recently made a distinguished entrance into the commercial satellite-launcher market.

An Unusual "Return"

A few figures to indicate the place of our efforts in this area: The Scientific Policy budget is confined to essentials, and Mr Maystadt, who in another connection fulfills the role of minister of the Budget, charged with trimming various public expenditures, has managed to keep the space expenditures at a moderate level. It's true that, with an expenditure in 1983 of the order of 1.3 billion francs, we are devoting to space only about 0.04 percent of our gross national product. The United States' score, on the other hand, is 0.2 percent.

Our share of the ESA budget is well over four percent, but Mr Maystadt is quick to emphasize that this money is almost all refunded to us in the form of employment and orders for our industry. The "return" on this money was recently estimated at 0.96. This seems to be a record for participation in an international organization.

This is due to the fact that our most modern industries have managed to establish themselves in very highly specialized areas where they have found a niche among the major industries of the large nations who, of course, want to reserve for themselves the essential aspects of the manufacture of rockets and satellites. Our five space industries have found a little something which gives them a completely particular know-how, and which they can use in terrestrial markets. Thus, according to the Belgospace association under which they are grouped, the country's space expenses have had a multiplication factor of six. Once again, remarkable.

Five Companies

Since 1962 Bell Telephone of Anvers has employed some 200 people in this sector. To do what? Essentially to manufacture telecommunications, control and simulation equipment. Example: one of its technicians "resides" permanently at Cape Canaveral to assure the maintenance of a complicated installation the task of which is to simulate the communication and control systems of Spacelab, which is to go up in the shuttle in a few weeks.

ETCA [Aerospace Engineering and Technical Studies] is a division of ACEC [Charleroi Electrical Engineering Workshops], which entered the space field in 1961 and now employes 150 people. It has concentrated its efforts particularly on energy conditioning in satellites and various instruments used on the launching pad of the Ariane rocket in Kourou, in Guyana. It also developed, with the aid of the University of Louvain-la-Neuve, stations for the reception of TV signals directly from satellites.

The FN [National Works] employs only thirty people from its engine division in its space section but, once again, very specialized products are involved, in this case valves for the Ariane's engines.

Sabca of Haren is our only space "mechanic". Its particular points of interest: structural elements for both Ariane and Spacelab, servo-controls for Ariane's engines, etc. Personnel employed: about 150. Finally, SAIT [International Telegraphy Corporation] Electronics of Brussels manufactures telecommunications equipment, in particular for ships, which don't have a space connection except that the easiest means for a ship to send an SOS or simply to communicate with its base is via satellite.

This activity, we could say, has strong non-space spin-offs. Thus, ETCA indicates that it has acquired a certain competence in the area of scientific instrumentation and Sabca has had to obtain electronic equipment intended for machine design, equipment which since then has proved to be very useful, particularly for participation in bids for which it was necessary to provide precise information very quickly.

The Sky, But Not for Dreaming

So much for the industrial part of our space miniepic. But our researchers too have looked up to the sky and they haven't done it in order to dream, but to acquire a recognized international competence. Thus, when Ariane had problems during its second and fifth launches, it was to the Mechanics Institute of the University of Liege that the ESA turned for diagnosis and therapy. The result was convincing, as the subsequent successes of this fine launcher attest.

In other respects many of our researchers have already abundantly participated in the design and application of satellites and other vehicles which have already been launched (the reader will recall that a piece of rock from the Moon was studied at the ULB [expansion unknown] by professor Jedwab), but the high-point of these efforts must be, for our researchers as well, the famous Spacelab. Six experiments with Belgian participation are to be performed on Spacelab, supervised by four scientific institutions.

Thus, the Space Aeronomy Institute will place various apparatus on Spacelab in order to study in an original manner rare constituents of the upper atmosphere and to observe a small part of the solar spectrum. The Uccle Meterological Institute will study the solar constant, the inconstancy of which may be the cause of certain climatic variations (it is already planned that this equipment will go up again with subsequent Spacelab missions).

A team from the Flemish university of Louvain will study the behavior, in a weightless environment, of the fusion of certain composite materials (ceramic and aluminum alloys, for example) which can be achieved only with great difficulty on Earth. Finally, the Anvers University Institute (UIA) is collaborating with the Clinical Research Centre of Great Britain to perfect a miniature recorder which will permit doctors to obtain knowledge of various parameters (electrocardiograms, electroencephalograms, etc.) of the astronauts' sleep. Here again, the earthly spin-offs are inevitable: a recorder of this type would permit better knowledge of sleep on our poor Earth as well...

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CSO: 3698/123

AEROSPATIALE COPES WITH RECESSION, CONFIDENT OF FUTURE

Paris L'USINE NOUVELLE in French 3 Nov 83 pp 36-39

[Article by Alain Pauche and Patrick Piernaz: "AEROSPATIALE Encountering Turbulence"]

[Text] The four divisions of AEROSPATIALE [National Industrial Aerospace Company (SNIAS)] are confident of the long term. But between now and then, it must cope with the recession... and prepare to come out of it in good fettle.

There is no questioning the fact: AEROSPATIALE, which does the final assembling of the Airbus and manufactures the Dauphin helicopter, the Exocet missile and the Ariane launcher, faces an 18-billion franc orders shortfall as of the end of this year. "In 1982," explains Henri Martre, CEO [chief executive officer] of the group, who succeeded Jacques Mitterrand 6 months ago, "we received only 16 billion francs of orders as compared with the 26 billion francs we should have gotten." The orders deficit, which is the only true barometer of the capital equipment industries, is therefore 10 billion francs short of the required 21-billion-francs. This year, the shortfall will be of the same order of magnitude against an equivalent revenue requirement.

Even if some big contracts were to be signed in the very near coming weeks, total bookings, which attained 47 billion francs in 1982, would not be sufficient to enable operation to full capacity, over the next few years, of the plants of a group that employs 36,500 persons in France.

In the Planes Division alone, 65 percent of whose business is derived from Airbus, underutilization this year will amount to 250,000 work hours, 95,000 of which will be at Toulouse.

Henri Martre has already taken the steps deemed indispensable to deal with what he terms "AEROSPATIALE's second temporary absence from the arena." Its battle plan is the result of some discerning trade-offs. As head of a state-owned company in a strategic sector, whose principal client is the state, Henri Martre does not have, any more than did his predecessors, the freedom of maneuver enjoyed by the presidents of Boeing, Hughes or Bell. Moreover, the steps being taken by AEROSPATIALE's top management draw their

inspiration from the very French principles of "solidarity." No layoffs are being planned. It is hoped to be able to make do by way of advanced early retirements, reductions in work hours and transfers of workloads between plants.

Henri Martre evidently wants to take things in stride. However, while he must take into account the social climate in a group that came into its own only a few years ago, he must also concern himself with maintaining the competitiveness of SNIAS, which now exports 55 percent of its production. Some unemployment of a technical nature must therefore be expected. It is virtually a foregone certainty that those affected will be the personnel of the Meaulte, Saint-Nazaire and Nantes machining plants.

To tide over this difficult period, Henri Martre has at least three advantages over the CEO's of the nationalized industrial groups such as Pechiney or Thomson, which are currently undergoing vast restructurings. To begin with, the company strategy is clearly defined. Secondly, its "estate" is impressive: The Airbus family is growing, the rebound of its helicopters market is assured, new missiles are ready for marketing, Ariane is proving itself, etc. And thirdly, the organization of the group into four divisions has proven satisfactory, even though the overall team spirit is not deemed by the new CEO to be sufficiently developed; he has just created a Directorate of Social Relations responsible for improving the coordination and the monitoring of the social policy laid down by the parent headquarters at Montmorency Boulevard, Paris. The crisis, however, remains to be overcome.

Price War Depleting Treasuries

AEROSPATIALE's most pressing concerns are definitely of Airbus origin. In announcing an order for seven A-320's ($240 million), British Caledonian Airways has just handed SNIAS its first good news since January. But as for the rest of it, this has been a dark year indeed! Added to the lack of new orders, there has been the cancellation or postponement of deliveries at the request of airline companies in financial trouble. The result: Parked on the ramps at Toulouse and Hambourg are 18 A-300's at $50 million each.

The airline companies are financially debilitated and have no idea how they are going to avoid the abyss of deregulation. For the aircraft manufacturers the results are equally debilitating: The price war is depleting treasuries and rendering investments more costly, even as it inflates inventories on the used-equipment market.

There is nothing exceptional about this situation. "One might even say this temporary absence from the arena is less worrisome than was our last one in 1976," remarks Rene Dor, assistant to the manager of the Planes Division. It is nonetheless true, however, that SNIAS is going to find it difficult to cope with Boeing, its direct rival. First of all, the element of surprise, which succeeded with the A-310, is no longer a factor. By rolling out the Boeing 757 and 767 in close succession, the Seattle-based firm is able today to offer directly competitive planes.

The market for this type of twin-aisle planes is estimated at a little over 3,000 units between now and the year 2000. With its A-310 and the A-300-600 (a modernized version of the A-300), Airbus is well situated, but it has not closed the gap to any extent whatever, the more so since Douglas has not given up playing the spoilsport.

More disturbing is the fact that, for the time being and for lack of a plane, Airbus must leave solely to Boeing two other segments of the market: The long-haul sector (400 planes over the next 20 years) and the short-to-medium-range, single aisle, 150-seat sector (3,200 planes over the next 20 years). For the long-haul sector, SNIAS is currently studying an extended-range A-310, the A-310-300, and has several new plane designs stashed away in its pigeonholes, in particular, the TA-11 (a long-haul plane with a small capacity of around 200 seats).

Airbus has decided to place all its bets on the A-320, that is, on its 150-seat short/medium-range airliner. The future market exists: It would replace the old DC 9, the 727 and the 737, which are noisy and big guzzlers of kerosene. In addition to British Caledonian's order (7 firm plus 3 options), the A-320 order book includes those of Air France (25 plus 25) and Air Inter (10 plus 10), totaling 80 planes. But more are needed yet for a decision to go ahead with a real launching, which must be arrived at before Christmas.

This plane is to be ready in 1988. Is its launching expected to have any immediate effects on SNIAS's plant workload plans? "Not necessarily," says Rene Dor. "But, by the second half of 1984, our shops could commence initial tooling-up operations." Above all, a decision to launch would have the effect of relieving tensions in the social climate, which has been exacerbated by the uncertainty. Without acknowledging it, the SNIAS's CEO is counting heavily on the effect of a decision of prime importance for the European aeronautics industry: "The A-320 is necessary for Airbus Industrie!" exclaims Henri Martre. It is every bit as necessary for SNIAS, which must pursue its investment program with no hope of attaining the billion-francs-per-year level of its halcyon periods. The question, however, is: Will it be able to attain, in 1984, the 500-million franc-level of 1982?

Airbus's production slowdown (4.5 planes a month) is not really being offset by the AEROSPATIALE Planes Division's other programs: Transall, Epsilon, ATR-42.

The second-generation Transall is still being built for the French Armed Forces at the reduced rate of 0.7 units per month until 1985. Absent any new orders between now and then, the production line will be shut down. The Epsilon, a small military trainer, has been ordered in the amount of 150 units by the French Armed Forces, but is still awaiting an order from abroad. As for the ATR-42 (46 firm orders, 14 options), a 50-seat twin turboprop regional transport plane, it is to be produced at a rate of not more than 5 planes a month till the end of 1985. The delivery outlook is for some 100 Airbuses between now and then.

Living Without a Military Space Program

Paradoxically, it is just when the Planes Division has at its disposal a staff that is competent and well-versed in the modern techniques of value analysis, and is equipped with ultramodern design and manufacturing facilities, that its orders are drying up. Its Helicopters Division (4.3 billion francs of revenue), which brings in 20 percent of SNIAS's total revenue, is in the same position. Its Ecureuil, Dauphin and Super-Puma are technologically higher-performance helicopters than very many of their competitors. But customers are scarce. The crisis is worldwide. The most solid of the marketplace's buttresses, offshore oil, has collapsed.

More worrisome: SNIAS let itself be outrivaled a few days ago by the American firm Bell for the construction of a $360,000 [as published] helicopter plant in Quebec. Here, AEROSPATIALE was the victim of principles it defends at whatever cost to itself. Who could reproach the national company for having, as is known, refused to sacrifice the interests of Turbomeca to those of Pratt, as well as jobs at Marignane to the advantage of the Canadians? The year 1984 thus looms also very bleak for the Helicopters Division, whose chronicle until now has read like a fairytale.

As seen by Francois Legrand, manager of the Division, its future health now hangs on two prospective niches: First of all, the decision to launch the new HAC-HAP [Nighttime Antitank and Support-and-Protection Helicopter], in cooperation with the Germans, which is already well under way. Secondly, the renewal of the tactical helicopters in service in foreign countries.

The outlook for the Ballistics and Space Division is encouragingly different, in that the Division is leaning more and more heavily on space activities to take up the slack in its military activities. The problem is that, to date, civil space activity has, generally speaking, been less remunerative than the military. Nevertheless, the recent assignment of prime contractorship for the Hades system (to replace the Pluton system) to the Division, by the Defense Ministry, carries with it a substantial workload for its Design Department.

Its space activities, which represent 22 percent of the Division's revenues, are growing rapidly. Since summer, its order book has swelled, with three METEOSAT satellites (900 million francs) and the signing of a contract to furnish the Swedish TELE-X satellite (650 million francs). AEROSPATIALE is part of the Eurosatellite Group with, among others, MBB [Messerschmitt-Bolkow-Blohm], and has joined forces with Ford Aerospace for the big Intelsat contracts; it also fully expects to win the INMARSAT [maritime satellites] bid. Between now and then, the Group finds itself handicapped, as does MATRA [Mechanics, Aviation and Traction Company] by the absence of a French military satellite program (the SAMRO [Military Optical Reconnaissance Satellite] has been abandoned), which would permit it, in the manner of the Americans, to amortize its investment in equipment and studies, enabling it to attain "some margin of profitability" in the civilian market. Pierre

Usunier, manager of the Division, points out philosophically, "We will simply have to learn to live without a military space program."

The Tactical Missiles Division is not subject to this type of pressure. It occupies a leading position on a worldwide basis and its 1982 revenues totaled 5.5 billion francs, up 25 percent over 1981 revenues. The strategy being followed by this division is highly exemplary. It is oriented along two axes: The development of missile families, the best-known of which is the Exocet, and the preparation of new generations of weapons, well echeloned in time, so as to have missed virtually not a single step in its advance.

The Division is today reaping the profits from its sales of its antitank Milan (160,000 units sold) and of its Exocet (2,000 sold), and can now bank on its production of helicopter- and plane-borne missiles. Around the turn of the decade, it will launch the ANS [Antiship Supersonic Missile], a ramjet missile developed by the Euromissile Dynamic Group, and an antiaircraft system with an antimissile capability.

In the case of many of these programs, the strength of the Missiles Division lies in its ability to integrate all the components, including the propulsion system, which gives it greater flexibility than that of its international competitors. Henri Martre should be able to capitalize on this capability to provide a more vigorous leadership to the Group.

This is all the more so since he will have to accept living more dangerously than his predecessor and absorb the poor results to come in 1984, just when the government is anxious to present to the country some positive operating results for the enterprises in the nationalized sector.

SNIAS, therefore, has no choice: It is going to have to incur more debt. Its indebtedness, which had been diminishing constantly for 5 years, will exceed in 1983 the 3-billion-franc level of 1982. The development of its future programs, the modernization of its design facilities and shops, and the financing of its overproductive capacities will require a great deal more funding between now and 1986. Henri Martre should not have very much difficulty in persuading the Defense Ministry and the banks. He is sure to run into greater problems when he tries to "sell" austerity to his 36,500 employees.

[Interview with Henri Martre, included as boxed insert: "Henri Martre: 'Our Rebound Will Come From the A-320'"; name of interviewer, date and place of interview not given]:

[Text] How is one to traverse a period of adversity as the employer of 36,500 persons in an industry undergoing a complete technological transformation? Henri Martre must at one and the same time cope with the recession and prepare the advent of new products, from the Airbus A-320 to the Hades tactical nuclear weapon system. A unique challenge for this general engineer, who until his present appointment headed the powerful General Delegation for Armament.

[Question] It seems that AEROSPATIALE is again on the verge of having to enter a period of considerable turbulence. How are you preparing for it?

[Answer] The head of a big enterprise must keep a constant eye on two outlooks: The long-term one and the near-term one.

As for the long term, I feel quite confident. The AEROSPATIALE group's four divisions have enough material pigeonholed to completely renew their product lines. As for the near term, I must admit that we face a severe slump in our activities. The freeze on airline company investments, the hardening of the Boeing-Airbus duel, the military budget cutbacks in the Middle East, the international crisis in the civil helicopters market, are all converging to produce a decline in our order bookings. We must therefore plan on an adjustment of our productive strength, taking into account a sharply declining workload outlook. We must be at the top of our form when we come out of this slump.

[Question] In cases such as this, Boeing lays off personnel pending a rebound in orders. How is AEROSPATIALE going to maintain its competitiveness?

[Answer] We are not going to reduce our overall staffing. We have just drawn up a defensive plan based on four lines of approach:

--A shortening of the work week: In June 1983, our work week was still 40 hours; currently it is 39 hours; by 1 January it will be 38 hours; thereafter, we plan to go down to 37 hours;

--Voluntary departures under advanced early retirement and a progressive early retirement system for employees over age 55 (part-time employment for volunteers); a new solidarity contract has just been signed to this effect;

--A slowdown in new hirings, except for positions at highly qualified levels and in data processing.

--Workload transfers between plants in the Group for better coordination;

[Question] Isn't there a good chance that this plan will not suffice?

[Answer] To achieve the best adjustment, we may have to resort to technical unemployment measures beginning around the end of 1983. But of course, we cannot at this time foresee the scope of these measures.

[Question] Of course, you will tend to accelerate the repatriation of subcontracts...

[Answer] No radical change of policy is involved. But it is true that we have reduced that portion of our subcontracting that was overly heavy. Thus, in the domain of planes it had reached 38 percent. We are now down to 26 percent. This is a reasonable level below which we do not intend to go.

[Question] Your adjustment plan assumes a sharp sales upturn beginning in 1985. Is that a reasonable assumption?

[Answer] Regardless of the level of economic recovery, the aeronautics industry expects a technical rebound of the market beginning in 1985-1986. Many planes will have to be taken out of service because of obsolescence. And between now and then, the airline companies will have put their internal finances in order. In fact, a rise in the rate of filling of seats is already evident.

[Question] How is the balance sheet for 1983 operations shaping up?

[Answer] Our year's operations are still benefiting from the big orders of the period of opulence. From the standpoint of revenues, we will not be far off the 1982 level of 21 billion francs. From a profit standpoint, we should end up within "projection limits." It is next year that things will get worse.

[Question] Airbus Industrie has suffered many disappointments recently. How do you view its future?

[Answer] The launching of the A-320 program is going to provide anew the thrust that has been lost since the setbacks of these last few months. It is essential that this plane be flying by 1988. We are awaiting a decision by the governments involved by the end of this year.

[Question] Won't this 150-seater be arriving a little late for a rebound in the face of Boeing's and Douglas's conventional models?

[Answer] That is true, but the A-320 is slated for a long career that will exceed by far the forthcoming situational rebound.

[Question] In placing its emphasis on the 150-seat plane, Airbus is abandoning the arena of the 200-250-seat long-range plane, to which Lufthansa attaches a great deal of importance. Is that a wise choice?

[Answer] I think the market for narrowbodies is much more vast than the one for the 200-seater. The A-320 carries a higher priority. However, we are still working on the TA-11 project.

[Question] Does the defeat sustained by the Helicopters Division in Canada jeopardize the future in any way?

[Answer] It is not a matter of major importance. To win the award, Bell deemed it worthwhile to eliminate many jobs in Texas and sign an exclusive contract with the engine builder. We did not want a plant in Canada at the price of sacrificing jobs in France and of our agreements with Turbomeca. This does not change the lay of the North American market, where we still have our entries in Canada. It should not be forgotten that we are the world's second largest producer after Sikorsky and that we have around 20 percent of the American market for helicopters.

SNIAS: Linchpin of Industrial Aeronautical Cooperation in Europe

SNIAS's Share in Joint Programs

Program	Share (in Percent)
Airbus Industrie (planes)	37.9
Euromissile (missiles)	50.0
Euromissile Dynamic Group (third-generation missile)	33.3
Eurosatellite (space)	24.0
GIE-ATR [Economic Interest Group-Regional Transport Plane] (regional transport plane)	50.0
Arianespace (launchers)	8.5

Of all the aeronautical construction companies in Europe, AEROSPATIALE is the one with the largest percentage of its revenue, that is, 43 percent [as published--see text], being generated through international cooperation.

[Question] Since taking over as head of AEROSPATIALE some 6 months ago, have you made any changes in the top management?

[Answer] It appeared necessary to me to restore a solid general inspection organization within the Group. I have entrusted this mission to Mr Courot. The Directorate of Social Relations has also been strengthened. For this, I have called upon Mr Roqueplo, who until now has been the head of juridical matters in the Defense Ministry.

[Question] What will be your high priorities as head of AEROSPATIALE?

[Answer] I have two. The first consists of going all out to develop our export marketing operation. I have virtually no worries from the standpoint of innovative resources on the part of our engineers, nor, for that matter, from that of productive apparatus. From a marketing standpoint, however, our teams need strengthening. World competition has become terribly tough in both the civil and military sectors. Our problem, now, is to find salesmen as determined and as experienced as those of our competitors.

My second priority is European cooperation. More than half of AEROSPATIALE's revenue depends on it. I devote a major portion of my time to direct talks with my German, British, Spanish and Italian counterparts. AEROSPATIALE is a daily proof that there definitely exists an industrial Europe.

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CSO: 3698/141

AEROSPACE

ARIANE 8 ARRIVES IN KOUROU FOR JANUARY LAUNCH

Paris AFP SCIENCES in French 27 Oct 83 p 31

[Text] The seventh model of the European rocket ARIANE had scarcely departed from the Kourou space center, carrying an international telecommunications satellite into space for the first time, when the first components of the eighth were starting to arrive in French Guiana.

The first two stages of the eighth ARIANE--overhauled by the Aerospatiale organization, builder and in charge of fitting the various rocket components together--arrived at the port of Cayenne on 20 October for unloading and shipping to the space center in preparation for the next shot.The third stage will be shipped later by air, after completion of the necessary modifications of its oxygen pump.

Like the previous one, the eighth model of the European rocket is to put a second INTELSAT-V satellite, from INTELSAT, the international organization of satellite communications, into transfer orbit towards the geostationary orbit (36,000) km.

In theory, this shot was to have taken place on 15 December. It had to be postponed until January, both to allow making the modifications on the oxygen pump and to check the functioning, while in orbit of all the components of the satellite launched by the seventh ARIANE on 19 October, especially the mechanisms reserved for maritime communications, whose malfunction had delayed that shot by 33 days.

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CSO: 3698/125

BRIEFS

COSTS OF SPACE PROGRAMS, LAUNCHES--The costs of space programs including costs of launchings are frequently difficult to obtain because of the multiplicity of sources and sometimes contradictory figures supplied by some of those sources. Here are a few acquired from high-ranking European and American officials during the TELECOM 83 World's Fair in Geneva.

Programs

TELECOM-1 : 2 billion francs in 1983 (2 operational satellites, a third in reserve, tracking stations, etc.)
TDF-1 : 1,500,000 million francs
ATHOS : 800 million francs
TELE-X : 650 million francs
ARABSAT : 700 million francs

Launchings (source: INTELSAT)

INTELSAT-V : by ARIANE-1, $2.7 million; by ATLAS-CENTAUR, $46 million
INTELSAT-VA : by ARIANE-2, $45 million; by ATLAS-CENTAUR, $64 million
INTELSAT-VI : by the shuttle, "in the neighborhood of" $100 million for two launchings; by ARIANE-4, not available. [Text] [Paris AFP SCIENCES in French 3 Nov 83 p 18] 9436

CSO: 3698/115

DAIMLER-BENZ EXPECTS GOOD RESULTS FOR 1983

Paris AUTO-INDUSTRIES in French 27 Oct 83 p 3

[Article: "FRG: Increase in Daimler-Benz Gross Revenues"]

[Text] Stuttgart, 27 Oct (AFP)--The Daimler-Benz consortium which manufactures Mercedes cars expects "an increase of its turnover as well as satisfactory financial results" in 1983, according to its preliminary financial statement published Thursday in Stuttgart.

During the first three quarters of the year the consolidated revenues of the consortium showed a 2 percent increase relative to the same period in 1982, for a total of DM 29.2 billion, in spite of the difficult situation of the international market for heavy trucks. The gross revenues of the parent company, Daimler-Benz, rose 4 percent, to DM 23.7 billion.

We are reminded that in 1982 the Daimler-Benz consortium became the first German car maker in gross revenues (DM 38.9 billion), ahead of Volkswagen.

Sales on the German market have increased 17 percent, up to DM 11.4 billion, while exports have decreased 6 percent, down to DM 12.3 billion.

Private car production should exceed that of 1982; 470,000 vehicles are expected to leave the assembly lines, against 458,345 the previous year. On the other hand, heavy truck production decreased by 10 percent between January and September, that is, 168,320 vehicles. The number of Daimler-Benz employees has remained constant. Investments will amount to more than DM 3 billion this year.

On the other hand, in Frankfort last Wednesday, while taking part in an international symposium, the consortium's chairman, Mr Gerhard Prinz, indicated that a reduction of the workweek would cause a decrease in Germany's ability to compete in world markets. It is worth noting that the first West German union, IG Metall, has started campaigning for a 35-hour workweek instead of the current 40-hour week.

12260
CSO: 3698/117

PEUGEOT SA REDUCES DEFICIT IN FIRST HALF OF 1983

Paris AFP-AUTO in French No 3346, Oct 83

/AFP 28193/

/Text/ According to an announcement on Friday by Peugeot SA (PSA), the Peugeot group will reduce its deficit in 1983 without, however, getting back into the black. PSA announced a total turnover, tax-free, of 41.9 billion francs for the first half of 1983.

The second half is expected to confirm the gradual recovery trend in the automotive group, according to PSA, which adds that "desired measures will continue to be taken to reduce costs and obligations of all kinds, as shown by the strength reduction program announced recently (Editor's Note: 7,540 jobs abolished at Peugeot and Talbot), in order to intensify and accelerate the development already under way."

On a comparable structural basis--that is, after the break-up of the "Ravi" and Peugeot-Loire companies, control of which was sold during the first few months of 1983--the turnover for the first half of 1983 increased by 5.9 percent as compared with the first half of 1982. It may be recalled that in 1982 Peugeot's total deficit was 2.1 billion francs.

For PSA, which does not supply an estimate on the total results for the first half of 1983, "the improvement of certain economic indicators and the increase in sales in the European and African markets are expected to bring about an increase in total turnover in excess of 25 percent in the second half, which would bring the increase for the entire fiscal year 1983 to approximately 15 percent."

/AFP 281940 Oct 83/

For fiscal year 1983, results will be lower than expected and "will still be far from the objective of getting back into the black" due to an increase in costs and in obligations of all kinds, partially reflected in costs of sales and in insufficient increases in productivity.

On the other hand, the foreign industrial subsidiaries will post an improvement, particularly marked for the British subsidiary "Talbot Motor Company."

In France, in the first half of 1983 the two companies Automobiles Peugeot and Automobiles Citroen have improved their commercial standing: they were affected in the previous year by the consequences of social conflict at Aulnay and Poissy.

Registrations for the first 6 months totaled 352,000 private and commercial cars (209,000 for Peugeot and Talbot and 143,000 for Citroen), an increase of 4.3 percent as compared with the first half of 1982. Their part of the French market rose to 33.2 percent as compared with 32 percent in the first half of 1982 and 30.2 percent for the entire year of 1982. This increase is due, according to PSA, to the acceptance given the two new models, Citroen BX and Peugeot 205 (together, 26.4 percent of French registrations in the Group).

In other European countries, the decrease in sales has been "rather pronounced," thus compensating for the increases achieved in France. Outside of Europe, on the other hand, sales have been "satisfactory," especially because of the very strong resumption of shipments going from Great Britain with delivery to Iran.

/AFP 28194 Oct 83/

During the first half, the Societe Peugeot SA /Peugeot Company, Inc./, which is the financial holding company of the PSA group quoted on the stock exchange, had an operating profit of 85 million francs, as compared with 140 million francs in the first half of 1982, for gross revenues of 223 million francs, as compared with 266 million francs.

Taking into account losses and profits, in particular a capital gain of 98 million francs, and, in the opposite direction, charges of 982 million francs, the provisional situation as of 30 June 1983 is a loss of 799 million francs as opposed with a net profit of 109 million francs during the first half of 1982.

5586
CSO: 3698/126

MITTERRAND VIEWS PROTOTYPE OF NEW RENAULT LARGE SEDAN

Paris AFP-AUTO in French No 3348 Nov 83

/AFP 031333/

/Text/ Cerizay, 3 November (AFP)--On Thursday at Cerizay (Deux-Sevres), President Francois Mitterrand took the wraps off the prototype of a new Renault car, during his visit to the Etablissements Heuliez /Heuliez Plants/, one of the largest industrial groups of the region.

The model of this prototype, a large sedan whose construction will begin at the end of 1984, was presented to the chief of state by M Henri Heuliez, founding president of the firm, and his PDG /president and general manager/, M Gerard Queveau, in a closed room barred to the press. For 45 minutes, M Mitterrand visited the firm's assembly lines, which make mainly automobile bodies and commercial vehicles.

The president met numerous local dignitaries including M Jean Grellier, elected mayor of Cerizay in March 1983 and sole mayor belonging to the presidential majority in the northern part of Deux-Sevres.

He also talked with the firm's union delegates, before shaking hands with some of the thousand-odd workers who waited for him at the exit of the plant's buildings.

/AFP 031334/

The Heuliez Plants, visited Thursday by President Francois Mitterrand, is one of the largest industrial groups of the Poitou-Charentes region.

Oriented mainly toward automobile bodies and construction of commercial vehicles, the Heuliez Group employs about 2,000 persons in its various plants, located mainly in the Cerizay region (Deux-Sevres).

Originating from a small blacksmith's shop operated from generation to generation by the Heuliez family in the town of Cerizay, the group now includes five production units and a holding company.

The principal firm, the S.A. Louis Heuliez Carrosserie [Louis Heuliez Automobile Bodies, Inc.], employs 1,100 persons on a 30-hectare lot at Cerizay. It produces, in particular, medium-size production runs of automobile models (such as the Peugeot 604 sedan and the Renault R5 caravan) and special bodies (ambulances, trucks, animal vans), as well as auto body parts for the large automobile firms.

S.A. Heuliez-Bus, specializing in the manufacture of buses, is the leading manufacturer of articulated buses in France (80 percent of the domestic market). It employs 450 persons.

In addition, some 140 engineers and technicians, using computers and the latest techniques, work at the S.A. Heuliez D.E.A. [expansion not known], a vehicle design and research office.

The group also has two manufacturing units outside Deux-Sevres: an auto body plant for special vehicles at Brou (Eure-et-Loir) and a plant specializing in military vehicles at Bourg-en-Bresse (Ain).

5586
CSO: 3698/126

AUTOMOBILE INDUSTRY

RENAULT: PRESENT SITUATION, EXPECTATIONS FOR FUTURE

Paris L'USINE NOUVELLE in French 17 Nov 83 pp 40-42

[Article by Georges Le Gall: "Renault On the Defensive"]

[Text] The leading French builder is gaining ground on the other side of the Atlantic, but is losing it in Europe and on the domestic market. In renewing its line, it hopes to recapture its lost shares of the market.

For Renault, 1983 has been the year of paradoxes. It took second place in the Formula One World Championship competition. Renault has never done better since entering this competition in 1977; but in this competition only first place counts.

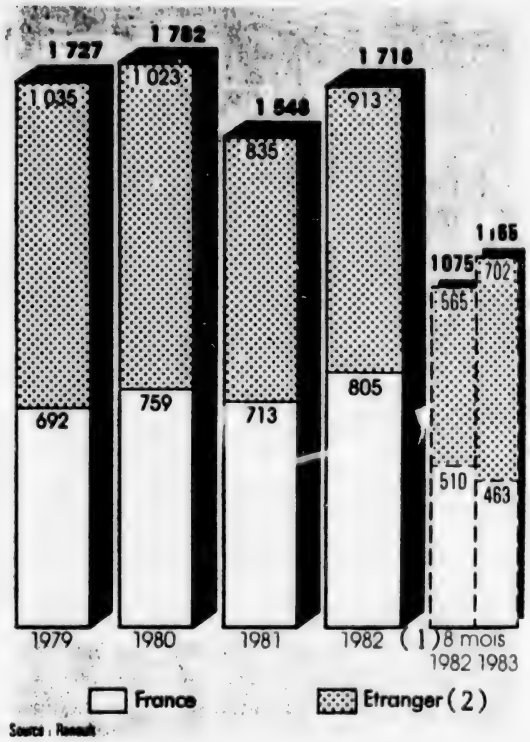
In the first 8 months, world sales of Renault private automobiles totaled 1,165,000 units, up 8 percent over the corresponding period in 1982. This might seem something to make a boast of. But Renault is not boasting. For, this performance is owing entirely to the satisfactory evolution of volume export sales, particularly to the United States, where Renault sold 117,000 cars (versus 26,000 during the same period last year), 94,000 of which were R 9's in the American version baptized the "Alliance." The success of these models, which since September 1982 are being assembled by American Motors, has exceeded all expectations. For 1983 as a whole, sales will total around 180,000 cars (versus 68,000 in 1982) in the United States, which has become Renault's second largest foreign market, after Italy and before Spain.

Unfortunately, this penetration of the U. S. market has been accompanied by a slump in France and in Europe. Whereas total sales of all makes of private automobiles combined on the domestic market during the first 9 months showed a slight slump (-0.3 percent), Renault sales dropped 10.6 percent; Renault still leads the other manufacturers, but its share of registrations dropped from 38.5 to 34.5 percent. Registrations on all the West European markets combined rose 5.8 percent during the first 8 months, while Renault's share of them dropped 7.5 percent. Having led all others in 1980 and 1982, Renault has ceded first place to Ford.

Total 1983 sales of Renault private cars on all markets combined will almost certainly attain a level close to the 1980 record (1,782,000 units) and the

Renault's Total 1983 Sales Nearing 1980 Record Level:

Sales of Renault Private Automobiles
(in Thousands of Vehicles)



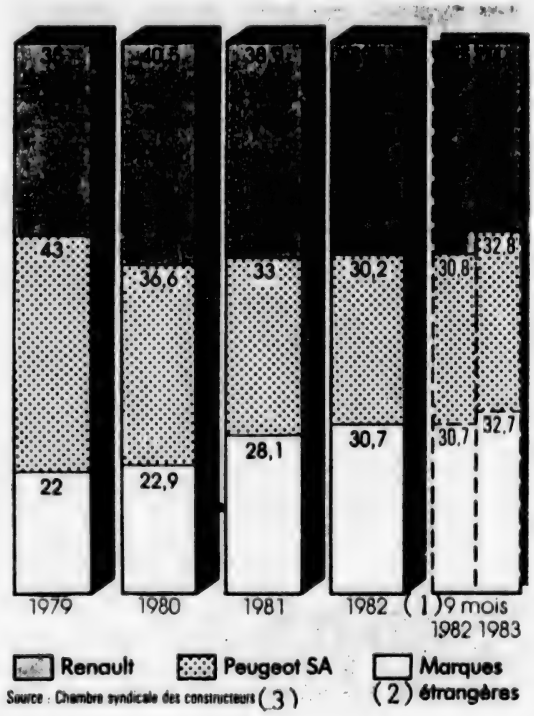
The drop in sales of Renault private automobiles in France and the other European markets since the beginning of 1983 has been more than offset during the first 8 months by the rise in volume exports, principally to the United States. It is probable, therefore, that Renault's sales for the whole of 1983 will come close to reaching their 1980 record level.

Key:

1. First 8 months [of indicated year].
2. Abroad.

In France, a Return by Renault to Its 1979 Level:

Distribution of Private Automobile Registrations in France (in Percentages of Total)



In 1980, Renault's sales of private automobiles on the French market suddenly jumped five percentage points, reaping the benefit of the equally sudden drop in Peugeot's sales. As spectacular as Renault's 1980 upturn was its 1983 downturn of four percentage points, which Peugeot split evenly with the foreign makes as a group, the latter group continuing the rise it began in 1981.

Key:

1. First 9 months [of indicated year].
2. Foreign makes.
3. Source: Manufacturers Board of Trade.

United States Soon To Be Renault's Principal Foreign Market

Sales of Renault Private Automobiles

Source Renault

	(1) En milliers de véhicules						(2) Taux de pénétration en % des immatriculations totales toutes marques	
	1979	1980	1981	1982	(3) 8 mois 1982	(3) 8 mois 1983	(3) 8 mois 1982	(3) 8 mois 1983
Italie	139	181	176	186	129	121	10,7	10,8
Etats-Unis (4)	19	26	31	68	26	117	0,5	1,9
Espagne (5)	195	215	160	170	114	112	33,4	31,6
Allemagne (6)	130	114	101	84	64	62	4,2	3,6
Grande-Bretagne (7)	93	88	72	64	51	46	4,5	3,4
Pays-Bas (8)	50	39	36	32	24	23	8,1	6,6
Belgique-Luxembourg (9)	43	39	34	36	27	22	9,6	8,3
Portugal	9	12	21	23	16	20	31,9	36,8
Suisse (10)	24	23	20	20	15	11	7,1	5,5

Renault's market positions in the Southern European countries are strong. Its penetration rates in Northern Europe are much lower. Since the start of manufacturing operations with American Motors in September 1982, the United States has become, in 1983, the second largest foreign market for Renault private automobiles, behind Italy and ahead of Spain. It is very likely that by the end of 1984 the United States will be Renault's leading export market.

Key:

1. In thousands of vehicles.
2. Penetration rate as a percentage of the total registrations of all makes.
3. First 8 months [of indicated year].
4. United States.
5. Spain.
6. Germany.
7. Great Britain.
8. Netherlands.
9. Belgium and Luxembourg.
10. Switzerland.

In Europe, Ford Captures First Place From Renault

Distribution of Private Automobile Registrations in Western Europe (in Percentages of Total)

(4) Source: Chambre syndicale des constructeurs

	1979	1980	1981	1982	8 mois (1) 1982	8 mois (1) 1983
Renault	13,3	14,8	13,9	14,6	14,0	12,2
Ford	11,9	11,1	12,2	12,3	12,2	13,0
Fiat	10,4	12,0	12,8	12,5	12,7	11,9
Volkswagen	12,4	12,1	12,8	12,0	12,2	11,8
Peugeot SA	17,1	14,6	13,1	12,4	12,5	11,7
General Motors	9,2	8,4	8,2	9,5	9,6	11,4
Marques japonaises (2)	7,1	9,7	9,2	9,0	9,0	9,6
Autres marques (3)	18,6	17,2	17,8	17,4	17,8	18,4

In the West European market as a whole (10 Common Market countries plus Austria, Spain, Norway, Portugal, Switzerland and Sweden), Renault, in 1980, captured the lead position previously occupied by the Peugeot Group with respect to private automobile registrations. In 1983, Ford took over the top spot in the listing. With the rises in the case of some and the drops in that of others, the positions of the six big European makers of mass-produced cars (Ford, Renault, Fiat, Volkswagen, Peugeot and General Motors) are currently very close to each other, with around 12 percent of the market for each group.

Key:

1. First 8 months [of indicated year].
2. Japanese makes.
3. Other makes.
4. Source: Manufacturers Board of Trade.

most likely assumption is that they will remain around that level in 1984, pending a new growth phase that is expected to begin in 1985 with the roll-out of its new models. For, the current line is now old.

Its ancestor, the R-4, was marketed in 1961; the R-5, a best-seller, in 1972; the R-20/R-30 in 1974/1975; the R-18 in 1978. Presently, therefore, there are only two recent models, with which the renewal of the line has commenced: The R-9 (1981) and the R-11 (1983). This bears out the fact that the evolution of Renault sales varies according to car types. In France, during the first 8 months, the R-5 led all other makes in number of registrations, but has itself dropped by more than 20 percent in this respect: This was expected. On the other hand, the drop in R-18 sales (-37 percent) was a disagreeable surprise: Renault had underestimated Peugeot and the selling power of the restyled 305. The R-9/R-11 line has already topped all of last year's R-9/R-14 sales by 20 percent.

Return to 40-Percent Penetration Rate Hardly Realistic

But here again, the above figure holds a disagreeable surprise: R-9 sales alone are down 15 percent. The success of the R-11 (5-doors) is at the expense of the R-9 (4-doors); some Renault officials think it would have been better to slip the launching schedule of the R-11 and advance that of the new top-of-the-line models.

Be that as it may, the renewal of the line will be speeded up. The R-25, which is to replace the R-20/R-30, is certain to be rolled out by the beginning of 1984. The R-5's successor will probably come out by the end of 1984, that of the R-4 by the beginning of 1985, and that of the R-18 in 1986. With these new weapons in its arsenal, Renault will undoubltedly pull up its penetration rates again. But in France, will Renault be able to recover the 40-percent share of the market that it had from 1980 to 1982? This is not all that certain. Peugeot, has set for itself the realistic goal of recapturing a 35-percent share and is well on its way to achieving it. For Renault to recover a 40-percent share, the share of all the foreign makes would have to drop by more than 35 percent to the level of 25 percent...

In 1983, the only major makes to have progressed in Europe have been Ford and General Motors. This evolution has been helped by a rise in total registrations in Germany (+13 percent) and Great Britain (+19 percent), countries in which these makes have a very strong foothold. It should not be forgotten, however, that Ford has recently renewed its line (new Escort, Orion, Sierra) and that General Motors has penetrated the lower end of the market with its Corsa.

Renault is preparing new models, but so are its competitors. The objective Renault has set for itself is to recapture first place in Europe. Even if it should succeed in doing so, this would not necessarily mean it would attain its 1980 record penetration rate of 14.8 percent of that market. To approach it, Renault will of necessity have to improve its positions in Germany (where its penetration rate has dropped to 3.6 percent...while Volkswagen has close

to 6 percent of the French market) and in Great Britain (3.4 percent). This means that Renault would finally have to overcome its traditional weakness at the top of the line: This segment has never represented more than 8 percent of Renault's production of private cars (a meager proportion, of the order of 25 percent, of which has been exported), while it accounts for 12 percent of all registrations in France, 16 percent of all registrations in Europe, and 30 percent of those in Germany.

This is the problem that is to be addressed by the R-25, the production rate of which, beginning in June 1984, is to be 600 a day, that is, 140,000 a year, or double that of the R-20/R-30.

The planned-development contract it has signed with the Ministry of Industry sets for Renault in 1985 a production goal of 2.5 million vehicles. This total, of course, includes utility vehicles (269,000 in 1982). It assumes, however, that in 1985 the production of private automobiles will be of the order of 2.2 million, versus a record production of 1.8 million in 1980. Renault, of course, is developing its international bases: Manufacture of the R-9 began in Taiwan and South Africa in 1983, with near-term targets of 12,000 and 10,000 units; in Mexico, the goal is to increase its market share from 7 to 15 percent, but demand is collapsing owing to the country's economic difficulties.

Is a Reduction of Employees Inevitable?

In the United States, the Kenosha plant is operating at full capacity (1,150 vehicles a day, or 250,000 a year) on the production of Alliances and, now, Encores (a version of the R-11). What, however, does the future hold, particularly with reference to the small cars of the Japanese builders allied with the Americans? Even if it recaptures a 40-percent share in France and 14-percent share in Europe, Renault will necessarily have to capture new markets to move 2.5 million vehicles: Renault is banking heavily on Algeria; but its contract, for some 100,000 cars a year, is now under discussion after some 10 years, and Renault is not the sole candidate. And lastly, the goal of 2.5 million vehicles assumes a number of favorable developments whose simultaneous occurrence would seem to border somewhat on the miraculous.

The problems of jobs at Renault will unquestionably be tied in with the evolution of sales. Between 1980 and 1982, when production (private automobiles plus small utility vehicles) dropped from 2 million to 1.9 million units (-4 percent), the payroll of the automobile branch (which does not include heavy commercial vehicles) shrank from 162,000 regular employees to 158,000 (112,000 in France, 46,000 abroad), a reduction of only 2.5 percent. Is Renault, with 103,000 employees, overstaffed? Not for the time being, says the top management; but middle management disagrees, citing a figure of around 4,000 persons, despite the terminating of contracts of an almost like number of temporary employees.

But the essential problem will actually arise in 1984 when the new models going into production will require less labor for their manufacture. If the

goal of 2.5 million vehicles is not attained in 1985, but rather in 1986, 1987 or later, palliatives such as the repatriation of subcontracting will not suffice. Despite the reserved attitude of the government authorities when asked to comment, it is hard to see how Renault can, on pain of becoming noncompetitive, not reduce its staff as its competitors do. The most recent example: Volkswagen has just announced the elimination of 13,000 jobs between 1983 and 1987, essentially through early retirements.

Verdict in Two Years

Improving its financial situation by taking advantage of the increased productivity being made possible by its investments (close to 10 billion francs per year) is a necessity for Renault, which has been in the red since 1981 and whose CEO [chief executive officer], Bernard Hanon, says that the Group will not be out of it till 1985. "If all goes well." And it is by 1985 that, under its planned-development contract, Renault must be financing 75 percent of its investments through its own internal resources, its present reinvestment rate being less than 30 percent. Financial soundness will also be needed to battle its competitors, the most formidable of which, in Europe, may very well be the subsidiaries of the American automobile makers, whose parent companies have made an impressive financial recovery. During the first three quarters of 1983, General Motors reported profits totaling $2.4 billion.

On top of it all, the road is a narrow one: "We cannot afford any half-successful models," acknowledges Bernard Hanon. Where, then, is Renault headed? Its management and technical staffs reflect a mixture of hope, based on its new models, and of concern over the shares of the European market it has lost. Most of the line is to be renewed in 1984-1985. Thus, the verdict will be known in 2 years: The wait will be much longer than for a Formula One first prize!

9239
CSO: 3698/146

BIOTECH TRANSFER CENTER ESTABLISHED IN MARSEILLES

Paris L'USINE NOUVELLE in French 8 Sep 83 pp 60-61

[Article by Michel Raphael: "Biotechnologies--a Transfer Center in Marseilles"]

> [TExt] Helping companies to integrate biotechniques and sensitizing researchers to industrial reality. This is the goal of the first transfer center which has just been established on the French Riviera.

The Provence-Alpes-Cote d'Azur region has its own biotechnology transfer center. It is the first time that a true institutional interface has been established in France. Marseilles is becoming a kind of pilot unit, a link in the national network that the Ministry of Industry and Research is trying to develop.

The main elements of this network are bioengineering in Compiegne, microbiological engineering in Toulouse, plant health and biology in Marseilles, dairy biotechnologies in Brittany, pharmaceutical industries in the Center, and bioreagents and vaccines in Rhone-Alpes.

Administratively, the Center is attached to the Regional Chamber of Commerce and Industry. The man in charge, Daniel Pardo, head of research at the CNRS on assignment to the Center, participated in the various preparatory phases. The final decision was taken on the basis of the report he prepared for the Retional Delegation of Research and Technology. "I have three years to put the finishing touches to the Ce~ter's development," he explains, "but it must be operational in the first year." Its resources: a 1.1 million franc budget for the first financial year and two engineers to join it some times in 1984.

First tasks: evaluate the region's potential and the immediate needs of industry, provide a technological watch, launch an information newsletter, and develop a training program for personnel in the public and private sectors. "It is just as necessary," Daniel Pardo believes, "to help companies to integrate biotechnologies as to sensitize research people to the realities of industry." The goal is to bring the

"fundamentalists" out of their laboratories and ease their blending into the industrial fabric. And--why not, after all?--encourage the entrepreneurial spirit. There are some precedents right in Marseilles: Immunotech and Germe.

Contract Monitoring

The next stage will le implementation. Few companies are able by themselves to carry at all the development phases of new techniques and products. Prototype development will be the job of the public sector. A novel feature: the mandate of the trnasfer center will be to monitor contracts and see that they are completed within deadlines compatible with market demands. If this channel becomes clogged, creation of one or more predevelopment workshops, to which researchers and engineers could be assigned, in envisaged.

As of now, one area has priority: the industry of essential oils and aromatics centered around Grasse (2500 jobs, one-third of the Department's exports, a d 15 percent of world sales in this sector). The usefulness for this industry of in vitro methods of cultivating plant cells can easily be imagined.

Other countries around the Mediterranean are becoming active. The Heraklion Institute of Biotechnology in Crete has a growing reputation, and Algeria has also recently made the decision to engage in biotechnology.

12434
CSO: 3698/45

KABI VITRUM USING DNA-TECHNIQUES IN SWEDEN

Stockholm DAGENS NYHETER in Swedish 15 Nov 83 p 11

[Article by Gun Leander: "New Insulin With Hybrid DNA"]

[Text] The first drug manufactured with the help of hybrid DNA is now on the market in Sweden. It is a new type of insulin manufactured not from animals but by means of human gene which has been "transplanted" to an ordinary E-coli bacterium.

"I have tried both kinds, and the new one takes effect more rapidly," says Bengt Warenmark, who is a diabetic. He is an employee at Kabi Vitrum. "The insulin sensations I feel are not connected with the same restlessness and anxiousness as before."

At a press conference on Monday Kabi Vitrum's managing director Bertil Jarnhall described the new insulin as a "milestone in the history of medicine."

"In the long run it is conceivable that certain patients could reduce their insulin dosage and make their treatment easier to manage, thanks to the new insulin," in the opinion of Assistant Professor Lars Wibell at the Academic Hospital in Uppsala. One of the most important advantages is that contamination and the risk of allergies in the patients are avoided. However, Lars Wibell found it difficult to see any proven, clear, practical differences between this insulin and the best swine insulin used today.

Animal Organs

The new insulin will also be 20 percent more expensive than the old one. It is considered largely comparable to the old insulin, although a number of contaminations can now be avoided.

Enormous amounts of animal organs were previously needed in order to manufacture insulin. For a paltry 450 grams of insulin, a 3.5 ton mountain of pancreas was needed....

Now the little E-coli bacteria do the job in test tubes. A synthetically produced gene, which is coded for human insulin, has been introduced into the genetic material of the bacterium.

Breakthrough

This is precisely what constitutes the breakthrough for the pharmaceutical industry: Unlimited quantities of human insulin can now be produced for the first time. In the long run it is hoped that the knowledge now acquired about hybrid DNA will make drugs cheaper in the future. Next in turn is the manufacture of growth hormone to prevent stunted growth caused by the pituitary gland. But that cannot be marketed until 1985 at the earliest.

There is a total of 200,000 diabetics in Sweden, approximately 54,000 of whom need insulin. The patient groups primarily being considered for the new, more expensive, insulin are:

Newly discovered diabetics
People who need temporary insulin treatment, for example during pregnancy, operations or sudden aggravation of the illness.
People who need extra large amounts of insulin
People who have become allergic to other insulin.

Insulin Pump

In the future completely new methods may replace or supplement insulin treatment, the researchers said at the press conference. So-called pro-insulin, which is found in healthy humans and which is both an early stage of insulin and has an effect of its own, will now be tested on animals. It is also produced by means of the hybrid DNA technique.

Tests of insulin pumps are now also under way in many places in the world. It is hoped that this will make it possible to imitate normal insulin secretion. The problem is setting the blood sugar at an exact level during the night, for example. An electrode which automatically reads the blood sugar level is now being tested experimentally. If it proves effective, the insulin pump will become considerably more reliable than today, Lars Wibell said.

The new human insulin has so far been tested by 10,000 patients all over the world before it came on the market; 30,000 diabetics in the United States, Canada, England, the FRG and Holland have switched to human insulin, or humulin, as Kabi Vitrum calls it.

Millions

A few figures which might illustrate the amounts involved: The insulin has cost about 200 million kronor to develop. Drugs in Sweden cost 4 billion kronor annually, of which 70 million are for insulin alone.

Of the entire 618-billion-kronor GNP (gross national product), 1.4 billion was for the treatment of diabetics.

A diabetic's insulin requirement costs 1,300 kronor a year.

11949
CSO: 3698/133

FOREIGN EXPLOITATION OF BELGIAN BIOTECH FEARED

Brussels LE SOIR in French 17 Oct 83 p 1, 7

[Article by Guy Gerard: "Biotechnology, Myth and Reality]

> [Excerpt] Biotechnology, which interests Mr. Gerard, will as we know be discussed at the Bynergium. It will be one of the topics of the colloquia held in Liege on Tuesday, October 18; an important participant will be a minister of the Executive of the Walloon region, Mr Wathelet.

Where do we stand in Belgium? Of course, biotechnology is topical here as it is everywhere. Everyone is talking about it; it has become a leitmotiv and sometimes an obsession. In general the media are doing well in their role of dissemination even though some camoflaged editorial publicity is manipulating the facts to promote interests which are not necessarily those of the country and its regions.

Biotechnology research in Belgium is in fairly good shape by comparison with other countries. We have a good position in the race. Our universities and research centers have a potential which other countries often envy. Biotechnology demands a thorough mastery of allied sciences such as genetics, botany, zoology, chemistry, biology, and engineering sciences. In all these areas we have numerous researchers and most of them are outstanding. Industry and the university are beginning to join hands. Companies are thinking about regrouping. Financially well-endowed Belgian holding companies and other companies often encourage innovation and entrepreneurs.

Thanks to a few reputable and well-managed Belgian chemical and pharmaceutical companies we have marketing channels for the biotechnological products that come out of our laboratories. If necessary, we have the managers to sell our patents and licences. What is more the small size of our country and its limited resources do not, for once, seem to play a negative role in biotechnology as is the case in other advanced technologies where we can only act at the European level--if indeed we have a Europe. True, biotechnology requires capital. But Belgian's potential rests not so much on capital as on daring, will, and effort, on good coordination of activities and on tax incentives for research.

Biotechnology is creating and will create jobs for scientists, high-level executives, and skilled labor. Its economic and technological spinoff is considerable. But to take the step to believing that biotechnology will become a substantial industry and will be a possible solution to our labor problems is to confuse wish with reality. No one knows what we will see in 10 or 20 years. Let's not listen to the merchants of promises which are premature to say the least. Let us act, but let us be realistic.

Belgium's national and regional government authorities are beginning to give financial support to biotechnology. Let us rejoice, but let us be on our guard because the action must be lead by people who know what they are doing...for as has too often been the case in the past, the failure to grasp problems may lead the government to believe that the grass is always greener on the other side! From time to time we fall back into our old habit of throwing public money at foreign companies and giving them all kinds of favors. It is easier and in the short term more glorious, although in biotechnology we hardly need foreigners to put our foot in the stirrup at a time when our university centers and other research organizations are having essential budget cuts and Belgian companies could do more and do it faster if the support were more energetic. True, authentic technology exchanges and joint investments with foreign companies or institutions are highly desirable, but on the condition that Belgian interests have mastery and above all control of them and provided foreign business actually brings us something original.

For over thirty years, foreign companies have received red carpet treatment in Belgium. They got money from us to buy our own businesses and our own technologies. Some foreign investments have been decisive in the past, and sometimes providential. But we have been incredibly naive at times: we have witnessed outdated or ill defined technologies, mere assemblies of no industrial usefulness, fallacious promises of investment, short-term management and dependence on foreigners, exploitation of the government's naivete in granting aid tied up in royalties which accounting shenanigans have made illusory, exportation of change in destination of loaned funds, transfers of our technologies to other pastures--all to see foreign companies pack their bags when the source of exclusive privileges to a few treasure-hunting experts dried up.

Don't let's believe that the moon is made of green cheese. Let's remember that subsidies for aid not justified by the facts can freeze Belgian initiative. Don't let's humor ourselves with decisions taking the path of least resistance and feather our own nest as blindly as an ostrich. In Blegium, especially in Wallonia, we have a strange taste for bizarre associations, something like one of these impossible objects like a coffeepot whose spout is on the same side as the handle. The object looks fine, and we smell the aroma. But we will scald our fingers and never get the coffee into the cup; and we will only see that it doesn't work when we try it!

The world is changing...the cards are being redealt. Biotechnology is a challenge that we can take up even better than we have in the past. The scientific policy of the government seems to have entered a stage of renewal. The Wallonian Region and the Flemish Region, each with its own style and with its own fads and fancies, are acting with dynamism, good will, and often with common sense even if certain initiatives leave us flabberghasted.

Let's remember the past. Let's protect our industrial and scientific future. Let's spend our francs to assure our identify, favor our national or regional interests, our technologies, our independence, our long-term research. A priority for our universities, our businesses, and our researchers. And if we want nevertheless to form bonds with others across our borders, let's insist on being in charge of the action and taking our share of the advantages. Let's be distrustful of bizarre associations and beware of creating new Titechs.

Otherwise, in biotechnology as in other fields, disillusions felt will be in proportion to illusions sustained.

12434
CSO: 3698/45

FRENCH SUPERCOMPUTER FOR MILITARY, INDUSTRIAL USE

Paris SCIENCES & AVENIR in French Aug 83 pp 42-48

[Article by Stephane Deligeorges: "Marisis: A Supercomputer Made in France"]

> [Excerpts] Two hundred million operations per second, one of the most powerful machines in the world: this is the computer France has decided to build. The objective is not to conquer a market and make money, but to become independent in this field. Indeed, our present defense system, our weather forecasts and our aircraft designs are entirely dependent on U.S.-made equipment. And, as we have seen recently, an embargo is always a possibility.

You first take Marianne, the very symbol of the Republic. The one with the Phrygian cap. Then you combine her with the Egyptian and mythological Isis, and there you have Marisis! That is, broadly speaking, a very big baby. Term of this hybrid's gestation: around 1987. Cost of delivery: a few hundred million francs.

The somewhat surrealistic presentation of this childbirth conceals a large national project and the hefty baby is none other than the largest computer we have ever built. After a few years of slow and careful consideration, France has decided to give itself a powerful scientific computer, one that will fall into the category of supercomputers. Marisis will have to think very fast, at any rate faster than the American Cray 1 and Cyber 205, the present champions for all categories in the computer hit-parade. Marisis will have an effective power of 200 megaflops, which means it will be able to complete 200 million arithmetic operations per second.

The declared ambition of the Marisis project is to make France truly independent in the highly strategic field of supercomputers. National independence, no less! It should therefore not come as a surprise that the promoter of this special weapon--the high-power vectorial computer--is the Ministry of Defense, as represented by its research organization, the DRET [Directorate of Research, Engineering and Technology].

According to Prof Andre Rousset: "It started with the Ministry of Defense's concern that it should own a very high power computer. Until now, all such computers were purchased in the United States. They belong to the IBM, the Cyber,

the Cray series. Now, it is well known that the United States sometimes raises difficulties about selling this equipment. But these machines are now becoming essential tools in designing a number of weapon systems. Especially nuclear weapons. As a result, a working group formed on Mr Martre, the general delegate's initiative began considering the matter in 1979. The group, chaired by Mr Jacques-Louis Lions, professor at the College of France and president of INRIA [National Institute for Data-Processing and Automation Research], presented its report. Then, the idea of the Marisis project took shape."

No one will be shocked to learn that France wants to protect itself from a possible embargo on this type of equipment. Let us now try and assess the technological relevance of the Marisis project.

From Payroll to Differential Equations

The Marisis project is therefore the union of Isis and Marianne.

In this union, Isis is the basic unit: it is a scientific vectorial computer (with a 64-bit word). The Bull Company will manufacture it. This elementary machine will be integrated into the multiprocessor system whose code name is Marianne (Interconnected Network Multiprocessor for Numerical Analysis). The Marianne system, which will be produced by SINTRA [Industrial Company for New Radioelectric Technology and French Electronics], will act as a monitor, i.e. a coordinator for the many Isis units that will compute in unison. Marisis is therefore the ultimate computer with a parallel architecture resulting from the integration of the basic Isis unit into the Marianne multiprocessor system.

Why was a parallel architecture selected? Generally speaking, the architecture of a computer is the logic organization according to which it is built.

The first large type of architecture is the pipeline type. Cray 1, for instance, is a large pipeline unit. In this type, the processors are lined up in Indian file: in a way, they do assembly-line work. As in a car assembly line, where each work station performs a single operation, each processor of a pipeline unit carries out one step of the computing and transmits the result of its work to the next station. With an architecture of this type, it is essential to achieve a very rapid data flow along the chain.

"With an architecture of this type, we might have stumbled on technological problems we would not have been able to solve," Mr La Rosa, head of the Marisis project at DRET, explained. "A large pipeline will be competitive only with very-high-speed technology. Well, we deliberately gave up this option. We selected the SIMD and MIMD architectures."

With the SIMD (Single Instruction Multiple Data) architecture, the organizational philosophy is to have a battery of elementary processors that are not directly connected to one another, as in the previous case, but are all connected to a single controller. In this particular case, all the data are transmitted simultaneously to each of the processes [as published]. There, they are all processed at the same time according to the same instruction. This so-called synchronous organization, which can use up to 100 processors,

is therefore well adapted to massive parallelism and is very efficient in making vectorial computations. A vector is a set of values that must be processed in the same manner.

"If you have an n-component vector," Mr La Rosa explained, "the various components are transmitted to the elementary processors, then the instruction is given and they all work at the same time."

Divide and Compute More Easily

The other type of parallel architecture to be used in the Marisis system operates in the asynchronous mode and is called MIMD, for Multiple Instructions Multiple Data. In this case, the data-processing program is divided into different tasks and each task is allocated to a single processor. This type of organization is much harder to manage. Operations must be regulated in a differentiated manner and it becomes difficult to coordinate tasks that are dependent on one another. "As a result," Mr La Rosa further explained, "a very large monitor is necessary to ensure the dynamic allocation of all tasks." Far fewer processors are then needed: 16 units at most.

We should also discuss the memory and software systems. We shall just indicate that Isis will use several languages: vectorial FORTRAN, FORTRAN with automatic vectorization and, at a much later date, languages derived from PASCAL.

We would rather present an overview of the overall design of the Marisis project which, in a way, is based on a modified version of the saying: "Divide and rule" which in data processing becomes: "Divide and Compute More Easily."

Therefore, at the origin, an Isis machine consisting of processors associated in the synchronous mode (SIMD) forms a whole that is suitable to process vectors, i.e. long chains of repetitive computations. The Isis unit can have a power of up to 100 megaflops.* As a comparison, a Cray 1S has a power of 25-30 megaflops under normal conditions. Then, by grouping Isis units in the asynchronous mode (MIMD), we obtain what amounts to the Marianne concept, or if you will the association of these two parallel types of architecture yields Marisis, whose power will eventually reach or exceed 200 megaflops.

Marisis officially became a national project earlier this year and two prototypes should be ready by 1986. By then, over 100 million francs will have been spent on the project, most of the financing to-date having been provided by the Ministry of Defense. The Ministry of Industry and Research also contributed to the project. A total of 15 million francs, exclusive of defense funds, have been spent on Marisis.

And both Professor Rousset and Mr La Rosa are glad that universities and large research laboratories and organizations are working together on the great compu-

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* Considerations on supercomputer speeds are based on the concept of megaflops. One megaflop represents one million floating point operations. The phrase "floating point" refers to the binary representation of numbers in scientific notation. In this notation, a number is represented as the product of a factor ranging from 0.1 to 1 (the mantissa) and an integral power of 10 (the characteristic). Thus, 5,500 is written as 0.55×10^4, and 55 as 0.55×10^2.

ter. "The Ministry of Defense is not the sole promoter of the project, although it was its idea," Professor Rousset explained. "The IRIA [Data-Processing and Automation Research Institute], for instance, is involved in many stages of the project as far as software and computer-control are concerned. The CERT [Toulouse Study and Research Center (ONERA)] and the LAAS [Automation and Systems Analysis Laboratory] in Toulouse, the IRISA [Institute for Research in Data-Processing and Random Systems] in Rennes, and the Nice University also contribute to the Marisis project. We have attempted to mobilize the French intellectual potential competent in this field. Especially those who have a good knowledge of parallel architectures. The Americans have been doing just that for a long time. When they start work on a large computer project, they always rely on large laboratories, like those of Los Alamos or Livermore, for instance, to develop the prototypes."

A Research Tool, From Nuclear Physics to Meteorology

When Marisis is available, will its large computing powers be reserved to military scientists exclusively? This may have been a cause for concern to some when they learned that the army was the major originator of the project.

Of course, scientists working on thermonuclear weapons will have much use for the national supercomputer. In the very-high-temperature very-high-density plasma generated by the explosion of an atomic weapon, the behavior of the environment is expressed by highly complex equations. These must take into account extreme thermodynamic behaviors when materials subjected to such exceptional conditions are studied.

Military detonation experts will also need Marisis. What happens when a projectile strikes armor plating? How will it deform it? How will the projectile itself get deformed? What thickness will it be able to penetrate? All these problems have to do with the deformation of materials that are solid under normal conditions but assume a plastic behavior under exceptional circumstances. There again, it takes a large computer to create an insightful model of such phenomena. But, as we mentioned earlier, large computers are also badly needed by various research sectors without any organic ties with military research.

Aerodynamics does not quite fit that description, as it is used both in military and civilian aeronautics. In both cases, there is the need to process equations describing what is going on in three-dimensional space. For instance, in aircraft design, if every single computation is very precise, it is possible to save a lot of money already in the initial stage. Fewer wing-tunnel and flight tests are necessary and the number of prototypes required to build the final aircraft is reduced. Simulation made a marked contribution in designing the Airbus A.310 wing-section; in that case, of course, the model involved only part of the aircraft. As a result, the wing, and therefore the fuel consumption were reduced.

Whether for a civilian or a war ship, naval hydrodynamics is another field that involves a study of fluid flows around a hull or a propeller. There again, very difficult problems are encountered. Civilian and military scientists will use Marisis for their work.

More generally, however, Marisis is designed to be a tool for all kinds of research, from nuclear physics to meteorology. "As you can see, it is first and foremost a question of national independence," Mr La Rosa insisted. "Marisis is not just a military project. Its objective is truly to achieve national independence."

Well, then? Is the Marisis project an attractive one? Is the decision to give us a French-made supercomputer convincing? Already burned by the various past versions of the Computer or Component Plans, some specialists have already expressed their misgivings and their doubts at the relevance of Marisis.

They variously cited the technical difficulties that French computer scientists will have to deal with and the fact that Marisis may well be obsolete by the time it is completed. A new Cray is under study and it just might make short work of the 200 megaflops announced for our computer. Although IBM appears to have run into problems in using the Josephson effect (when computers operate at temperatures close to the absolute zero), its expertise of this technology could accelerate and enable it to outstrip many challengers. And if we are talking about large computers, why miss out on an all-purpose supercomputer this time, and choose to make do with a high-power but specialized machine?

From an entirely different point of view, are we not running the risk to spend very large sums on a machine that will certainly be efficient, but horribly costly compared with some of its peers?

Finally, to end this list of issues raised by the project, will Marisis act in any way as a driving force for computer research in our country, and what industrial impact will it have on the data-processing sector as a whole?

A Cautious Project Likely To Evolve

According to Professor Rousset: "We should understand that, strictly speaking, Marisis is a public service with all the financial implications of such a service. It is not, therefore, a commercial project. Only a few units of that computer will be produced, for those who really need it, like the Atomic Energy Commission or the aeronautics industry. However, this should be said without prejudice as to possible commercial spin-offs that may come out of the project as a whole. Generally speaking, we should hope that the industry will manage to make the most of any spin-offs."

What could these spin-offs be? One of them could prove profitable. Isis is a modular machine; the number of processors may range from 8 to 64. Thus, if we associate 8 or 16 Isis units, the resulting processor corresponds to the computer concept called array processor. Many laboratories would like to own machines like that for large computations, as these machines can provide a few megaflops. These array processors will become widely available on the market in the late 1980's. Bottom-of-the-line Isis models will fall into that range. Therefore, if the Bull Company can produce such medium-power vectorial processors at competitive prices, it will be able to make money. Another expected spin-off could result from the progress made in MIMD architectures. At present, there is an increasing trend to make minicomputers out of microprocessors. The SM 90,

for instance, is a machine in which a battery of microprocessors are federated to make a minicomputer. The MIMD architecture, too, can be used to produce original machines for which there is a market.

Finally, all those in charge of the Marisis project insist that it was developed with caution. It does not involve any dead-end technology added just for the sake of developing a futuristic piece of hardware, but only products whose performances are based on thoroughly mastered technologies. No entirely new basic machines, but a proven process that can be adapted. Of course, the promoters of the project do not rule out the use of a new technology once it has been tried and tested. "Take gallium arsenide," Mr La Rosa explained. "Considerable research on this component is done in France. If results are obtained within the next two years, and if we have gained expertise on this semi-conductor, then there would be no reason not to redesign our machine."

It would then become possible to increase Marisis' power by one order of magnitude, especially if technical people can provide circuits working at the temperature of liquid nitrogen (77 K). In the latter case, power could be increased 50-fold. "At any rate," Mr La Rosa concluded, "it should be understood that our project is in a state of potential evolution!"

9294
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FRANCE BALKS AT 'ESPRIT' FUNDING PROPOSAL

Paris AFP SCIENCES in French 27 Oct 83 pp 2-3

[Text] In Luxemburg, on 26 October, France balked at a decision on the financing of the ESPRIT program involving research in the field of information technology, it was learned at the end of the meeting of the ministers of research.

The Ten have again clashed over funding problems, in spite of the broad agreement they reached among themselves about the ESPRIT program, designed to enable the EEC to effect a breakthrough in the field of information technollgy.

Seven delegations voted in favor of the overall funding program proposed by the European Commission, i.e., 1500 million ecus (one ecu equals 0.87 dollar) over five years, half being contributed by the companies involved and the other half, 750 million ecus, by the EEC.

France rejected this figure and proposed to allocate 400 million ecus to the ESPRIT program, while Great Britain and the FRG refrained from stating their position while awaiting a solution to the EEC's budget problems.

Although France has been committed to launching the ESPRIT program from the start, its position was called "surprising" by Etienne Davignon, the European Commissioner of Industry and Research.

In response, the French Secretary of State for Industry, Jean Auroux, affirmed: "France's outlook is responsible and constructive. We are taking the ESPRIT program very seriously, but the quality of a program is not just its cost."

Mr. Auroux likewise stressed that other new policies in the field of biotechnology and telecommunications would also require a large financial commitment by the European Community.

The ESPRIT program is to allow Europe to catch up with its American and Japanese competitors in ten years.

Indeed, Europe covers only 10% of the world market in information technology and 40% of its own market in this field, which represents a business of 500 million dollars per year with a growth rate of 8-10% per year.

The project, launched by the impetus of twelve large European organizations for information technology, is to associate industry, universities and research institutes, with the assistance of the European Community.

Five priority areas for work have been laid out by the Commission: new microelectronics, advanced information processing, software technology, office automation and robotics.

The ten research ministers have decided to meet again in Brussels on 5 November.

8838
CSO: 3698/125

SWEDISH COMPUTER FASTER THAN SUPERCOMPUTERS, SELF-PROGRAMMING

Stockholm NY TEKNIK in Swedish 10 Nov 83 pp 33-34

[Article by Christer Berglund: "Fast Computer Draws Own Conclusions"]

> [Text] A computer which draws its own conclusions and can program itself has now left the development stage and been launched commercially. Scientists at Linkoping Technical University have brought out the computer, which is faster than today's fastest supercomputers. It will now be used to analyze pictures, but many other applications are in the future. The computer works according to entirely new principles. NY TEKNIK explains the philosophy behind the new Linkoping GOP computer.

This computer is the basis for the newly formed firm Context Vision, which will now launch and manufacture it--mainly for superfast picture analysis.

A large number of new applications are in view, for example control of unmanned industrial processes and a new generation of human-resembling robots.

"The GOP computer is suitable for tasks within the area in which relation-dependent calculations are required. It is an entirely new way to make calculations and we do not know all the applications which will be possible," said the managing director of Context Vision, Gunnar Wedell, formerly the managing director of Data-Saab.

"It will be a missionary activity to awaken sleeping requirements. But there are also requirements already known. The areas we will invest in are criminology, remote analysis of satellite photographs, and in medicine, to search for cancer cells and identify chromosomes, for example."

It is a type of calculation which is based upon recognizing patterns in pictures. Most such calculations can be done by ordinary computers also. But the GOP computer does them up to 100,000 times faster.

It has to do with the so-called relation-dependent calculations in the computer. A picture consists of a number of data points which create density in the picture. These points and the relations between them form the pattern or structure of the picture.

Point by Point

The computers that we are accustomed to search through the picture point by point until they have found a sufficient number of data points to indicate the details of the picture. That is a time-consuming process, and it presupposes a program so that the computer will know what it should do. The program in turn is built on a given data structure. Say that it concerns temperature. Then the computer seeks the temperature value.

The GOP computer does not have this limitation. It can take data and use it as a program. That is possible through a hierarchical construction in which data on one level will be a program on a higher level. The connection, the relations in a picture are then not given in advance, but follow by themselves the calculations of the machine.

If one has a satellite picture, the machine looks first at a small area of a few millimeters with a hypothesis of what is happening. That gives only a certain orientation and the area can be a forest or a city. If one is unlucky one can not even make out what it is by eye.

It is here that the connection control comes in. The machine then looks at an ever larger area which describes the limits and terrain of the area. In relation to a larger surroundings perhaps a line appears which on the first level was the edge of a road or if it is a forest, the edge of a grove of trees.

One could say that the machine matches itself to a knowledge of the picture by peeling away the nonessentials. That enables it on each level to go from the result of the next level below and thereby get less and less information to process a greater and greater area.

Interprets Information

And that is not all--later there is a feedback of information from the higher level. Interpretation of tendencies in the picture which become clear on the higher level control operations in the local events on the lower level in the picture. Finally it gives a total portrayal of the picture.

"That is what is so remarkable. The conventional computer is so shortsighted that it roots around on the first level and has trouble, for example, in seeing topographically whether the terrain is concave or convex," said the man behind GOP, Gosta Granlund, professor of picture treatment at Linkoping Technical University.

"But a structure has several levels. It concerns all structural information, pictures, sound, speech--all within artificial intelligence.

"It can be used to find submarines. What distinguishes the sound from hydrophones is not just frequencies and strength, but also local events in the sound. If the local event in a structure is released, one can get decisive information and recognize the submarine by relating the local noise to the structure of the higher order."

Within the treatment of pictures there are a number of ways to describe different phenomena: curves, edges and so-called textures. The problem is to be able to put the phenomena together in a larger connection when they are described in different ways.

New Way of Working

But the calculations in themselves can be done in an ordinary computer. It is just a question of how fast and which program is required. A program can be established to function in a given area of application and its speed can later be significantly increased by larger, more advanced machines.

The GOP prototype, which was developed at Linkoping Technical University, has parts which can be connected to any other computer. But they give only muscle and power. The new feature of GOP is how the machine works.

Precisely as the GOP computer uses other computers, it also uses parallel connected processors to increase the possibilities of combinations and thereby the speed of calculation.

"The problem is to get a conventional computer with parallel connection to be effective. It can only be that if it is on the same operation with a number of different data. But if it is on several different operations at the same time on several different data, it cannot retain all the different combination possibilities. It is only possible if the information in the computer is presented both as data and as operation," said Gosta Granlund.

Visual Principle

This basic principle for the GOP computer makes it possible to simultaneously structure and process data. That creates both situation structuring and speed in the way the computer works.

The way of presenting information is based on the simplest visual human forms. It was from there that Gosta Granlund got his ideas.

"It is a property of vision that the information is represented in cyclic or symmetrical forms on the lowest level. In the entire nervous system that appears to be standard. Say that the nervous system had several different ways to represent information, then that would be a problem in the embryonal and evolutionary development of the human."

The symmetrical standard forms create similar symbols on each level in the GOP computer hierarchy, and thereby make communication and feedback possible.

Applications

Now one can ask whether this general method of arranging and expressing information is of any practical importance. So does Per-Eric Danielsson, a colleague of Gosta Granlund at the Linkoping Technical University and himself one of those who is behind another picture treatment system, the so-called Picap System, which has already achieved practical applications, including graphic presentation.

"It is difficult to know if this will be such a general method. One can solve problems as they arise. It is not so pretty, but one can find a way today and another next week. That is perhaps how one must live with technology."

So it is also on the everyday side of technology. That includes fitting the computer to a very definite function of economic value.

But the advantage with a consistent system like GOP lies on the other hand in its ability to modify itself for different tasks.

"In order to control a complicated system, such a computer as this with a large number of degrees of freedom is required. Then unmanned factories or very flexible robots can be controlled. It only depends on supplying sufficient amounts of information," said Gosta Granlund.

But there are still 5-10 years of development work remaining before that point is reached. The question is whether the GOP computer has the capacity, even if it has any intelligence. Another colleague of Granlund, Eric Sandevall, professor of datalogy, is skeptical.

"Any stupid person can see an aircraft far away. But that does not require intelligence. And a hawk of course has sharp eyes. Perhaps one can say that Gosta's system is a sharp-eyed hawk."

Question of Definition

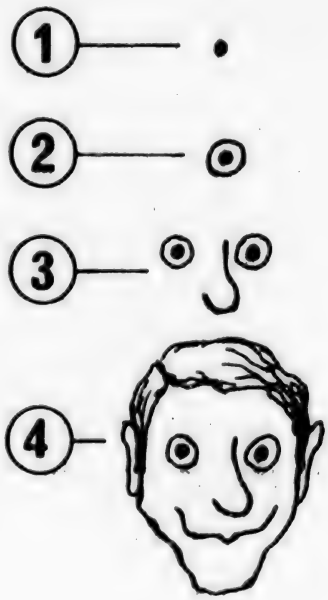
What intelligence is is largely a question of definition. Traditionally research in artificial intelligence takes another direction than that of the GOP system.

"The classical beginning in artificial intelligence is based on a system with symbols of high complexity. But there are many drawbacks with high complexity symbols. I believe that in that direction artificial intelligence is faulty. Instead we have similar symbols on different levels where the complexity is determined by operations. The result is that we can deal with

a large amount of information on a large number of levels, and no one else can," answered Gosta Granlund.

"That makes it possible to structure learning information also. That includes telling the computer if it did right or wrong. And that is much easier than to speak about how that will be done. But it is probably necessary for future computer systems."

This Is How the New Computer Works



This is what happens when the GOP computer processes a picture.

First of all the computer gets a command to search for a face in the picture. The computer then begins by processing the points which are found within a very small area of the picture. In this case it establishes that something black is involved (1).

Then it goes farther and processes a larger area--or as the scientists say--a higher level (2).

The computer then establishes that the black area is round. Thereafter it goes farther to process a still larger area or level (3).

Then it establishes that there actually are two symmetrical objects adjacent to each other with something in between.

Then when it goes farther and processes a still larger area--(4)--
it sees that the two symmetrical objects are located inside an almost circular structure. It has found a face.

As soon as it has that knowledge the computer also knows what it has found on the way. That knowledge is then passed down to the lower levels.

The knowledge that the two symmetrical objects are eyes in a face is passed to level (3). The knowledge that the round black object is one of two eyes in a face is passed to level (2). The knowledge that the black object is part of a pupil in an eye in a face is passed to level (1).

Recognize Eye

If the picture is processed further, for example the eye, the computer knows directly where it can find another.

In an "ordinary" computer one must know before the picture is completely analyzed what one is looking for. Then one can store the position of an eye. But if it happens that it really was a nose that was to be studied, the picture must be processed again.

Risk Company Arranged the Money

Behind the newly created Context Vision and the GOP computer is the risk company Provex, from Sunne in Varmland, which obtained 71 million kronor capital from banks and major companies such as Esselte, Bofors and Ahlsells.

"The project is going full speed from the beginning, and will come to the market sooner with so much risk capital behind it," said Provex Managing Director Ake Wester.

It is a common problem for high technology firms, after a while to realize that they do not have enough money and they must devote themselves to getting more money instead of developing the firm. But money is far from sufficient to match new technology to a successful application in the marketplace.

"We have tried to invest in high competence in industry and the electronic area. It is just as important to have human capital which can tie into the firm, and not just passively wait for profits," said Ake Wester.

"Our job is to see that the firm gets a sparring partner which can formulate a direction without destroying creativity."

Therefore it is no quick cut or passive placement of capital, but rather patient, long-term investments. Provex has a time perspective of 10 years before profits are expected. But then their cards have been played so well that the cash register is ringing loudly when they sell out their share of the business on the OTC market.

9287
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FACTORY AUTOMATION

MBB DEVELOPS LIGHTWEIGHT AUTOMATED RIVETER

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 10 Aug 83 p 5

[Article: "Lighter Riveting Automat for Airplane Builders"]

[Text] Messerschmitt-Boelkow-Blohm GmbH, Ottobrunn--An automatic riveter weighing only 28 kg has been developed by the company. It is intended for use as a hand tool anywhere on complex aircraft structures. As reported by MBB, the starting point for the development was the discovery that available automatic riveting machines weigh up to 160 kg but are usable for only about 60 percent of the riveting jobs encountered in aircraft construction. With the MBB TFH-21-PL development on the other hand, the company believes that flawless riveted joints can be made anywhere on complex aircraft structures for the first time.

In this connection, MBB says specifically: For this riveting machine, the tool motions (drill-feed unit, rivet injector and alligator jaws) are arrayed radially to the work coordinates, and the required radius of action is only twelve mm. The range of applications extends from clip spar and clip stringer riveting to the riveting of components made of graphite reinforced plastic (CFK) components. Also, close-tolerance tactile-sensing manufacturing systems can be equipped with this ultralight riveting unit.

The most important technical data: the keyboard-programmable electronic process controller serves only as a functional trigger for the riveting cycle. Additional inputs and outputs for a CNC positioner are available. Power is provided by an air motor (2300 rpm) with an angle-drive gear box. The maximum hole diameter is 5.2 mm in aluminum. The adjustable pull-in force is about 30 kilopound; the drilling force is about 90 kilopound. The riveting rate is about 6 to 8 rivets/min. The pneumatically-actuated alligator jaws have a clamping force of about 4,200 kilopound at 6 bar. Universal, halfround rivets up to a diameter of about 4.8 mm can be used. By swapping the driven and set heads of the rivet, other sizes can be used.

According to MBB, a prototype of the riveting machine is about to undergo an endurance test under service conditions in the Transport and Passenger Airplane Division at Einswarden. However, the new development has already survived its first rigorous test without problems: 22,000 rivets were driven just during the European Machine Tool Exhibition as a functional demonstration to a knowledgeable audience.

9160
CSO: 3698/409

MBB IN FRG AUTOMATES PRODUCTION OF AIRBUS FUSELAGE SKIN

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH THE WIRTSCHAFT in German
1 Nov 83 p 5

[Article: "MBB Automates Fuselage Skin Manufacturing"]

[Text] Messerschmitt-Boelkow-Blohm GmbH (MBB), Ottobrunn. According to MBB information, the necessity for cost reduction is also forcing greater rationalization in Airbus construction, resulting in the automation of the production process. The company has recently designed and built at the Varel plant a new drilling and milling machine for automated manufacturing of fuselage skins for the Airbus. In the future, the large, single-piece, spherically shaped parts of the Airbus skin to be built at MBB will be manufactured on this type of machine. The conventional manual milling and drilling operations for making skin plates, which are expensive in time and cost, are dramatically improved with this machine, especially in the economic aspects, the company reports.

The skin plates, measuring several square meters in area, are formed into cylindrical or spherical shapes by appropriate tooling, but before installation on the Airbus fuselage, they have to be trimmed to exact dimensions within prescribed tolerances in the tenths-of-a-millimeter range. Further, the plates have to be readied for joining to the frames and stringers of the fuselage. In the past this has been done manually with two processes using templates: 1) a milling cutter is moved along a template contour and the outline of the part is developed to prescribed accuracy by metal removal; 2) the holes required for joining the plates to the frames and stringers are also drilled manually with the aid of templates. Further, cutouts have to be made in the plates for windows, portals and doors. These steps are now accomplished with the highest precision and repeatability by the drilling and milling machine in an automatic, numerically controlled manufacturing process involving a single set up without templates.

The previously formed plate is clamped to the machine table to be worked with the aid of a vacuum system. A number of strategically positioned vacuum units hold the otherwise bendable and sensitive plate during the work. Above the machine table in a mobile frame is located the angularly articulated milling head with an extendable drilling and milling spindle.

The milling and drilling action is controlled with the aid of a friendly control system having high intelligence provided by a Siemens Sinumeric-8-MC CNC system or an equivalent Bosch system. The program memory of the control system is expandable to 256 K bytes. In the CNC system is integrated a freely programmable adaptable control, resulting in a control concept with high flexibility for interfacing with the machine's features.

The working spindle has been equipped with a spindlenose seal recently developed by MBB to prevent oil leakage. This is very important for working bonded parts. Also considered while designing the machine was the possibility of using it for working aluminum or paper (Nomex) honeycomb as well as fiberglass- or graphite-reinforced composites.

9160
CSO: 3698/124

BRIEFS

AID FOR ROBOTS, CAD/CAM--Frankfurt, 9 August--After 1 January 1984 the introduction of CAD/CAM systems and the development and introduction of robots will be supported through a new special program "Manufacturing Technology." A total of DM 350 million will be made available for this support program. The contracting procedure will be administered with minimum red tape following the pattern established for the microelectronics support program initiated earlier. The contract administration agency will be the Nuclear Research Center, Karlsruhe. For the development and introduction of robots, up to DM 800,000 will be made available for each company; for the introduction of CAD/CAM, the corresponding figure is DM 400,000. Release of the program by the Federal Government is expected in September 1983. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 10 Aug 83 p 5] 9160

DAINICHI-JAGUAR ROBOTICS COOPERATION--The Japanese company Dainichi Kiko, one of the world's foremost robot manufacturers, will assist the British auto builder Jaguar, of the British Leyland group, to develop robots meeting the special requirements for manufacturing de luxe automobiles. A contract to this purpose was signed in London on 24 October between Jaguar, Dainichi Kiko, and the latter's British subsidiary, Dainichi Sykes. This collaboration will begin with a study program costing 750,000 pounds ($1,125,000), one-third of which will be the responsibility of the British government. The probable outcome will be a program of investments in robots in the Jaguar plants, for which the company envisages an outlay of some 50 million pounds (70 million dollars) during the next five years. According to John Egan, Jaguar president, the goal is to allow "the most efficient possible production of cars, costwise, without sacrificing any of Jaguar's characteristics." British Under Secretary of State for Commerce and Industry John Butcher, who was present at the contract signing, affirmed that this important agreement would help make Great Britain one of the world leaders in robot implementation and manufacture. [Text] [Paris AFP SCIENCES in French 27 Oct 83 p 66] 8838

FRENCH INDUSTRIAL ROBOTS CENTER--Paris--Under the Production Engineering Plan, the LNE [National Testing Laboratory] has been assigned recently by the Ministry of Industry and Research to draw up a study on the creation of a national center for the evaluation of industrial robot performance parameters. The evaluation of industrial robots from the standpoints of functionality, reliability and safety of utilization is an essential stage in their development. Most of the countries that are developing a robotics industry are studying and developing methods which should in the very near future lead to standardization, characterization and certification of industrial robot performance parameters. The ministry's decision is consistent with the European agreement undertaken in this domain by the FRG [Federal Republic of Germany], Great Britain and France, who have formed a joint working group, participating in which, besides the LNE, are the DIMME [Directorate of Mechanical, Metallurgical and Electrical Industries] and the ADEPA [Agency for the Development of Automated Production]. The LNE, which under the aegis of the National Bureau of Metrology has undertaken a research program on the static testing of industrial robots, expects to be able, by the end of next year, to also undertake the study of methods for evaluating the performance of these machines under dynamic conditions. Officials of the LNE expect to be able to submit their conclusions by this spring, with regard to the setting up of the national center it is desired to create. Actually, the LNE itself, with the facilities it has at its disposal, could house the center in question. [Text] [Paris AFP Sciences in French 10 Nov 83 p 26] 9238

CSO: 3698/146

MICROELECTRONICS

REVIEW OF WEST EUROPE-JAPAN ELECTRONICS ALLIANCES SINCE 1978

Paris L'USINE NOUVELLE in French 17 Nov 83 pp 49-50

/Article by Alain Pauche and Daniel Solano: "Europe, the Japanese Bridgehead"/

> /Text/ The Japanese business offensive is not strictly commercial; an opportunistic strategy of alliances with European manufacturers is also employed.

Since 1978, the Japanese have created a network of industrial (licensing) and commercial cooperation agreements in the four major Community countries (Germany, France, Great Britain and Italy). These agreements say more about the diversified electro-data processing strategy of the Japanese than most of the statements of principle that come out of the Euro-Japanese meetings periodically sponsored by the Common Market.

These cooperation agreements are implemented either through joint ventures or through more discreet, less well-defined agreements, such as those relating to technical assistance, licensing and all other marketing agreements. It is in the electronics industry, however, that the greatest variety and number of cooperative agreements is noted: French purchases of American patents and licenses amount to nearly 50 percent in electronics and 97 percent in data-processing...

However, the Japanese redeployment in Europe is taking place in a touchier context. It reveals European divisions and draws attention to the risks of greater European technological dependency and the capacity of high-tech industries to create jobs (assembly of Japanese VCR's in Europe at best requires less manpower than their manufacture).

This table of the main agreements reached between the four major European countries and their Japanese partners since 1978 is not meant to be exhaustive. It does allow for a better understanding of Japanese strategy and a better appreciation of the motives of manufacturers and of the German, English and French governments. In fact it makes several points:

-Large numbers are involved in this cooperation: components, computers, electronics for the general public;

-The four major European countries are involved, but Great Britain is the country most often "approached";

-In France, the Thomson group, the leader in electronics for the public, has signed the most agreements.

The extent of these ties raises two questions: is it an indication of support for European solidarity? Are the European partners being used as "bridgeheads" for a Japanese invasion?

For the Japanese, it's a question of getting their foot in the door of the European marketplace while avoiding commercial frictions. However, Japanese firms are also making large investments: six Japanese brands already have production plants for television sets in Great Britain. Several VCR production plants have recently been established in Europe or soon will be. Four factories producing semi-conductors are presently in operation: NEC in Ireland and Great Britain, Hitachi in Germany and Fujitsu in Ireland.

The assault on the computer market is complicated by the presence of the Americans and the Europeans, who are well established in Europe. Here, Japanese strategy is based on the OEM agreements (Original Equipment Manufacturer), under which European firms sell a Japanese computer under their own labels. This is the case for Hitachi with Olivetti and BASF, and for Fujitsu with Siemens and ICL. European motives are of course different. Their interest lies in either rounding out a line of available products or gaining quick access to a technology without costly investment.

Certain agreements are already long-standing: Siemens' cooperation with Fuji (in which the German group holds 10 percent of the capital) dates from the thirties.

The stakes are high. The Europeans must make the best possible use of these agreements to guarantee their competitiveness, saturate market sectors and, using their own technologies, prepare themselves to attack new strongholds. All this must be done on a worldwide scale. The Japanese must...catch up.

Japanese electronics firms, which have invested heavily in North America (1,140 million dollars in the last few years), in Asia (643 million) and Latin America (273 million) have channeled only 226 million dollars to Europe.

LICENSING JOINT-VENTURES

THE MAJOR EUROPE-JAPAN AGREEMENTS SINCE 1978

FRANCE	UNITED KINGDOM	FEDERAL REPUBLIC OF GERMANY	ITALY
COMPONENTS			
NEC/MATRA HARRIS SEMICONDUCTORS Technical agreement for the manufacture of 4 bit microprocessors in France	**TOSHIBA/PLESSEY** OEM agreement for sale of 16K RAM memories	**FUJI/SIEMENS** Assembly of integrated circuits in Japan by Fuji Electronic Components (Fuji 50%, Siemens 50%)	**TOSHIBA/SGS-ATES** Licensing agreement for CMOS integrated circuits & joint development of a new family
COMPUTERS			
	FUJITSU/ICL OEM agreement for sale of top-of-the-line Fujitsu computers. Fujitsu will supply components for future Estriel and DM1 systems.	**FUJITSU/SIEMENS** OEM agreement for sale of top-of-the-line Fujitsu computers and Siemens laser printers **HITACHI/BASF** OEM agreement for sale of Hitachi computers	**HITACHI/OLIVETTI** OEM agreement for sale of Hitachi computers
COLOR TV-PUBLIC			
HITACHI/VIDEOCOLOR (THOMSON) Supplying of small television tubes to Videocolor	**HITACHI/GEC** Joint production: 300,000/year capacity **JVC/THORN-EMI** Supplying JVC with sets for the British market		**HITACHI/ZANUSSI** Crossover agreement for technical cooperation in TV and electrical household appliances
VIDEO CASSETTE RECORDERS			
JVC/THOMSON-BRANDT OEM agreement for sale of JVC VCR's. Licensing agreement for the manufacture of JVC VCR's	**JVC/THORN-EMI** OEM agreement for sale of VCR's	**JVC/TELEFUNKEN** OEM agreement for sale of VCR's	
	ACCORD J2T: JVC/TELEFUNKEN/THORN-EMI Joint assembly of VCR kits 2 factories: (400,000/year)		
	HITACHI/MAWELL Joint manufacture of cassettes (starting 1984)	**MATSUSHITA/ROBERT BOSCH** VCR manufacture (Matsushita 65%, Robert Bosch 35%)	

AUDIO

PIONEER/MUSQUE DIFFUSION FRANCAISE
Joint production of sound systems in a new factory: Pioneer 70%, MDF 30%

ALPINE/SEIMA (NEIMAN)
Licensing agreement for the production of car radio-cassette parts

HITACHI/THOMSON-BRANDT
OEM agreement for sale of compact disc readers

OTHER AREAS

TEAC/THOMSON-CSF
-5% participation in TEAC by Thomson-CSF
-Agreement on the manufacture of educational videocassettes in Japan

SHARP/THORN-EMI
Agreement to develop home security devices

SWEDISH GOVERNMENT PROPOSES MICROELECTRONICS AID PROGRAM

Stockholm NY TEKNIK in Swedish 10 Nov 83 pp 18-19

[Article by Erik Mellgren: "Investment in Swedish Electronics--Government Considers Giving Semiconductor Industry a Hand"]

> [Text] A national microelectronic program will strengthen the Swedish semiconductor and electronic industry. This year the government will give 44 million in supplementary appropriations to training, research and industrial development.

Semiconductor technique and especially integrated circuits are becoming all the more important.

The semiconductor industry's products go partly to the original electronic industry. But they are also important for other industries, which are using all the more electronics in their products.

That is the precondition for the national microelectronic program which the government is now presenting in a proposition.

The proposition is based on a recommendation for a national microelectronic program which came from STU [National Board for Technical Development] last spring.

STU wants to invest 549 million of national funds in research, training and industrial development during a 5-year period. Of that amount, 295 million is "new money" and 245 million has already been decided upon.

Sweden is not going to be able to compete with the United States or Japan in standard circuits, according to STU and the Ministry of Industry. Therefore the investment is directed toward customer-adapted integrated circuits and special components for optoelectronics.

The government will begin the program during the current budget year. It will grant 44 million in supplementary appropriations as follows:

- Training. Total of 7 million kronor. Two million for advanced training of instructors and gainfully employed design engineers, and the remaining 5 million to equipment for microelectronics training in high schools.

- Basic research. Five million in new money to semiconductor research, in addition to the 10 million which was planned earlier.

- Objective research. Eight million which goes to STU to study new manufacturing processes and new types of components, for example those based on other materials than silicon.

- Industrial development. Twenty-four million invested in the areas which include eight subprojects. One of those, Construction Systems for VLSI Circuits, is ready to begin. Pilot studies are taking place for the others. Industry will contribute at least an equal amount.

During the 5 years that the program will run, a total of 165 million will be granted by the state to industrial development. But industry will, as stated above, contribute with at least an equal amount.

In practice that means that firms concerned must come up with significantly more. Altogether several hundred million. The firms concerned are in this case Sweden's two large semiconductor manufacturers, Asea and Hafo och Rifa.

The subprojects can be divided into four groups:

- Project Manufacturing Resources for small series and short transit time will, together with Project Metalization of Gate Matrix, give Swedish firms quick access to finished circuits or prototypes.

A gate matrix is a semifinished circuit where the final function is determined by how the different logic elements, gates, are connected electrically to each other.

Estimated costs for the two projects according to STU: 50 and 12 million respectively.

- Project Construction System for VLSI and Methods for Ensuring Quality of VLSI will give reliable automatic construction systems for VLSI circuits, meaning very high grade integrated circuits.

The project cost according to STU: 36 and 14 million respectively.

- Project Quick Gate Matrix, VLSI circuits with less than one ns (billionth of a second) step delay, and Building Technique for systems with signal frequencies greater than 100 MHz will together give a production technique for circuits with high performance for advanced system applications.

STU's estimate of project costs is 15, 150 and 13 million kronor respectively.

An important aspect of these subprojects is that the true costs could be significantly greater.

- The eighth subprogram, Digital and Analog High Speed Circuits in gallium arsenide will add to production ability for the next generations of electronic and optoelectronic circuits. Estimated costs: 40 million kronor.

Cable TV Supports Semiconductor Industry

Rapid development of a Swedish cable TV net can force the Swedish semiconductor industry into manufacture of optoelectronic components.

This was said by the Ministry of Industry in connection with the government's proposition on a national microelectronic program.

Some of the components involved are semiconductor lasers and detectors used in connection with fiberoptics. They are made of gallium arsenide and similar materials instead of silicon.

9287
CSO: 3698/135

SIEMENS COMMERCIALIZES FAST ECL GATE ARRAYS

Paris ELECTRONIQUE ACTUALITES in French 28 Oct 83 p 17

[Article by F.G.: "Siemens Commercializes a Series of Fast Prediffused ECL's Having up to 2,600 Gates"; passage in slantlines printed in italics]

> [Text] /Siemens has just put on the market a series of prediffused arrays with the 100 K ECL technology compatible with 10 K: SH 100 C, characterized by a minimum propagation speed of 230 ps per gate (versus 500 ps for the previous series, SH 100 B) with a guaranteed clock frequency of 300 MHz (500 MHz for a flip-flop) and a consumption of 2.4 mW (minimum) per internal gate./

The SH 100 C series consists of three models: LSI 36 (36 cells for a maximum of 900 gates on a 24 mm^2 chip); the LSI 24 (24 cells for 700 gates and 128 bits of RAM on 24 mm^2) and the LSI 120 (120 cells for up to 2,600 gates on a 75 mm^2 chip). They are now available for starting the development of circuits. Industrial production is expected to start before the end of the year for the first one, in the first 3 months of 1984 for the LSI 120 and during the following 3 months for the LSI 24.

The SH 100 C series is produced with the German company's ECL technology using 2 μm lines, OXIS II, with basic configuration of CML gates placed in series on three levels. (It is this configuration that has allowed a propagation time of 230 ps). The LSI 120 has three metallization levels (two for customizing interconnections, as in the LSI 36 and 24) and a third one (the last one) devoted only to power supply.

The new Siemens fast prediffused arrays are housed in fakir carriers with 64 pins for the smallest ones and 144 pins for the 2,600 gate model (however, a 64-pin version is also being considered for the latter); they function between -30 and +75°C with a power supply voltage of -4.5 V (operating as 100 K ECL) and -5.2 V (10 K ECL).

In addition to logic cells, they also have a number of input and output cells (42/38 for the LSI 36, 30/38 for the LSI 24 and 86/80 for the LSI 120) which can also be used to implant minor logic functions.

A Four-Bit ALU on File

The LSI 36, 24 and 120 prediffused arrays are customized by implanting a number of predefined functions held on file into the prediffused cells (in clusters of four with one reference voltage generator per pair). This file consists of: 44 logic functions of MSI complexity (basic gates, flip-flops, 1 and 2-bit adding functions, multiplexers, demultiplexers, locks, etc...) which can be implanted in one cell (maximum: two adjacent ones); preconnected macrofunctions which can take up to 12 cells as a 4-bit arithmetic-logic unit, 8-bit adder/subtracter, and 36 types of I/O operations. The output terminals are all compatible with 10 K and 100 K ECL, and some of them can even control 25 and 50 Ω bidirectional lines; there are also fast output pads (0.95 ns).

One must add 50 ps per charge and 50 ps per mm of interconnection to the 230 ps minimum propagation time per gate for a 2-bit adding array with an input/output of 1.

Regarding circuit development, Siemens can undertake all customizing after being provided with a logic drawing including clock signal specifications (in this case, delivery of the first 20 samples will take 4 months), or it may allow the client to use its CAD system based on the cell storage file and the PRIMUS software, either directly in his own office through a terminal connected to its central computer in Munich or in its design center located in the same city. In that case, production takes 2 weeks from the time the mask-generating tapes are received.

12260
CSO: 3698/117

BRIEFS

INMOS SUPER MICROPROCESSOR--A new super microprocessor, able to single-handedly transmit 10 million instructions per second, has been developed by the British company INMOS, the company disclosed on 2 November. INMOS is saving the specifications of this new microprocessor, called Transputer, for an electronics meeting scheduled to be held in the U.S. next week. The company, which was founded by the British government in 1980 to create a semiconductor industry in Great Britain, indicated only that the Transputer is a true microcomputer, as powerful and fast as the biggest IBM computers of scarcely three years ago. Five million pounds (7.5 million dollars) have been spent in its development, and INMOS plans on being able to deliver the first models to its customers in 1985. [Text] [Paris AFP SCIENCES in French 3 Nov 83 p 22] 8838

CSO: 3698/128

BMFT SYSTEM OF TAX INCENTIVES, INDIRECT AID SUMMARIZED

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
9 Aug 83 p 5

[Article: "Government Aid Readily Available"]

[Text] Bonn, 8 August--From many pots large and small, business can obtain governmental aid for research and development. Small and medium-sized businesses especially can fall back on many sources. So much is supported that the list is hard to unravel. To make it easier to comprehend, we are publishing in the following an overview of the funds available outside of direct aid of individual research and development projects--that is, tax incentives and indirect aid.

Measure/Instrument	Since	Companies Supported	Type of Support
Contributions to wages and salaries of R & D personnel (Ministry of Economics)	1979	Sales up to DM 50 million and up to 500 employees; not a subsidiary of a larger company	40% subsidy up to a total of DM 120,000 per year
Special writeoffs for R & D investments (Art 51(1) Nr.2 EStG)	1965-1974 and 1984-1989	All	40% of procurement and manufacturing costs of mobile business goods for R & D, up to 15% for fixed goods
R & D investment bonus West Berlin (Art 19 Berlin Subsidy Law)	1962	All companies investing in Berlin	40% for first DM 0.5 million, 30% otherwise (20% for buildings)
R & D investment bonus FRG outside West Berlin (Art 4 Investment Subsidy Law)	1970	All	20% for first DM 0.5 million, 7.5% otherwise (some for buildings)
Payments for outside contracted research (Federal Ministry for Research and Technology: BMFT)	1978	Sales up to DM 200 million; not a subsidiary of a larger company	30% of contract amount up to DM 120,000 per year

Measure/Instrument	Since	Companies Supported	Type of Support
German Risk Capital Corporation (WFG)(BMFT)	1978	Small and medium-sized	75% of the annual loss of the WFG as minority owner
Applications of Microelectronics (BMFT)	1982-1984 (per agreements)	All	Subsidies: 40% personnel and contract costs; 20% investments up to a total of DM 800,000 over program life
Start-up aid (BMFT)	1983	Young, technology-oriented companies	3 phases: consultation; product development; credit for production equipment

9160
CSO: 3698/409

VW RESEARCHERS CRITICIZE FRG POLICY TOWARD FOUNDATIONS

Duesseldorf VDI NACHRICHTEN in German 28 Oct 83 p 25

> [Excerpt] In 1982, the Volkswagenwerk Foundation supported research projects and scientific activities with DM18 million. Engineering and the natural sciences thereby again become more prominent. The largest European science foundation is confident that it can remain financially healthy this year, despite smaller receipts, and that it can continue to support science and technology at a "substantial level." In the report that has now been presented for 1982-1983, there is clear criticism on the policies of the Federal Government toward foundations.

To be sure, the foundation "gratefully" acknowledged that Federal Chancellor Kohl, in his government policy statement, announced relief for the foundations. In its annual report, however, the Volkswagenwerk Foundation shows its disappointment over the fact that the disadvantages arising for nonprofit foundations out of the 1977 reform of the corporation profits tax were not eliminated, as was hoped. On the contrary, it is feared that instead of that, changes in the general foundation laws are planned.

The foundation draws this conclusion from the report of the Federal Government on research using third-party funds. It is observing further developments "with attention and concern," and says that it would be disappointing if a real and urgently needed strengthening of the foundations and foundations concept does not occur.

The foundation has become less dependent on the economic development of Volkswagenwerk AG. Now only one-fourth of its total receipts are dividends from the shares of the Federal Government and the Land Lower Saxony in Volkswagenwerk AG. Thus only limited losses are expected from the failure to pay dividends in 1983. In 1982, the foundation, with DM164 million, had the second-highest gross proceeds in its history (1981: DM167 million). By far the largest portion comes from loans to the FRG and the Federal Railway out of foundation capital (which amounts to DM1.34 billion).

In 1982, DM87.6 million was approved for 559 individual projects (it was DM96.4 million in 1981), of which two-thirds went to university researchers. Additionally, there was DM26.5 million provided by statute for projects that are proposed by the Government of Lower Saxony. These resources serve to improve the research structure of the Land Lower Saxony. The resources that the foundation gives out in accordance with its own criteria are concentrated in 26 main efforts. Almost half (48 percent) of the applications for support were rejected by the experts. In view of the dwindling public resources as well as the increasing immobility of the state budgets and the university research organizations, flexible foundation grants are gaining in importance, even for the new generation of scientists.

A highly qualified research capacity, top-level research and newly developing research areas are of particular interest for the Volkswagenwerk Foundation. In the forefront are research area in which the FRG is lagging behind, as well as projects that can contribute to recognizing and solving socially important tasks.

Thus there is increasing promotion of research projects in engineering science. In this area in 1982, particularly large amounts were approved for research in the main efforts "bases of technical combustion processes," "behavior of metallic and ceramic materials under operating conditions," science of microstructures" and "mathematical and theoretical bases in the engineering sciences." In the project of the main effort "physics and chemistry of unconventional materials--production and characterization," for example, the electric conductivity of synthetics is investigated.

The purpose of a new program "Promotion of the Infrastructure in the Engineering Sciences" is to assist the traditional technical universities in adjusting to the new demands on research and instruction in such areas as microelectronics or energy technology. The until recently strongly supported areas of biology and medicine are no longer represented in the program of main efforts of the Volkswagenwerk Foundation. Investigated in the main effort "synergetics" are basic processes of structure-building through self-organization; this is the source of strong influences on all exact natural sciences. The application of scientific methods in archeology and the maintenance of monuments is promoted in the main effort "Archeometry."

9746
CSO: 3698/120

OVERALL NETHERLANDS R & D FUNDS 1.97 PERCENT OF GNP IN 84

Paris AFP SCIENCES in French 3 Nov 83 pp 1-2

[Article: "The Equivalent of 20 Billion Francs To Be Spent for R and D in the Netherlands in 1984"]

[Text] The overall expenditure for R and D in the Netherlands in 1984 is being estimated at 7,546 million florins, or the equivalent of 20.4 billion francs. This expenditure corresponds to 1.97 percent of the GNP. These figures, as well as others, were given by the Dutch government's ministry of scientific policy to a group of European scientific reporters invited for a briefing trip in the Netherlands.

This expenditure remains virtually the same as in 1983. It is distributed as follows:

--3,546 million florins (9.6 billion francs)--0.93 percent of the GNP--for expenses financed by the state. On top of that, 1,452 million florins (9.6 billion francs) will go to universities and higher institutions of professional training and 2,092 million florins (5.6 billion francs) to research agencies and institutions.

--4,000 million florins (10.8 billion francs), or 1.04 percent of the GNP, will be financed by industry.

Dr P A.J. Tindemans, the general manager of the office of public management for evaluation and R and D programs in the ministry, explained that in the Netherlands, universities do 40 percent of the public research, or 1.6 billion florins. However, 70 percent of industrial research is carried out by five companies, like Philips, Unilever, Shell, etc.

The largest center for public research (mainly applied research), the TNO [Dutch Institute for Applied Scientific Research], whose work force numbers more than 4,500 people, will have some 450 million florins in all at its disposal.

The ministry of scientific policy's own budget accounts for only 100 to 150 million florins, and the ministry "has only 40 to 50 million florins at its disposal to directly finance this or that activity."

That said, the minister of science has the overall role of coordinating R and D spending, although he does not have supervision of this spending. He should assist "wherever things are not going well," with incentive appropriations, assistance to the ministries directly concerned, critical scrutinies of the activities of research centers, etc. Furthermore, he is currently conducting audits of all the research institutes and agencies.

A country like the Netherlands, Mr Tindemans feels, reflecting his minister's point of view, "should make choices and pick out the openings in the battlements where it can be strong or a special effort is needed for political or sociological reasons.

For example, the areas where a special effort should be made are the following:

--water in all its forms and in particular, regarded as a frontier and even a front where we must continually move forward (including the strictly-speaking marine area).

--contamination of the soil (the fight against pollution).

--agro-alimentation.

--problems posed by urbanization and minorities.

--the problems of the PVD [developing countries].

--evaluation of the technological impacts.

For three years, special work has been carried on in the area of technological innovation, the responsibility for which has moved from the ministry of science to the ministry of economic affairs, which was "a painful operation."

Lastly, the ministry of scientific policy has launched a large-scale activity in the area of the IST [Higher Technical Institute]. To the approximately 60 million florins (162 million francs) appropriated for this purpose in 1982, a year that saw the publication of the report "education and information technology," an additional 200 million florins (more than half a billion francs) are to be spent between now and 1988 to spur activities in this area.

9064
CSO: 3698/109

FABIUS STATEMENT ON FRANCE-FRG INDUSTRIAL COOPERATION

Paris AFP SCIENCES in French 3 Nov 83 p 3

[Text] The French minister of industry and research, Mr Laurent Fabius, expressed pleasure on 31 October in Bonn over cooperation between France and Germany and their desire to develop new European industrial projects.

"There is highly significant cooperation between France and Germany. We are trying to develop European projects, and nothing is better than personal contacts between those in charge," Mr Fabius told AFP at the conclusion of two working sessions, one with the West German minister of economy, Mr Otto Lambsdorff, and the other with the minister of postal administration, Mr Christian Schwarz-Schilling, sessions which he described as "highly productive."

Messrs Lambsdorff and Fabius did a survey of questions on industrial cooperation and among companies from the viewpoint of the summit meeting of European chiefs of state in Athens on 4, 5 and 6 December and the next Franco-German summit meeting on 25 November.

Numerous problems, especially that of new technologies "which is one point on which France would like to see progress made," according to Mr Fabius, were touched upon. Insofar as steel is concerned, Mr Fabius felt that the European market must be as stable as possible so that a solution may be reached in Athens.

Mr Fabius held talks with Mr Schwarz-Schilling on telecommunications and satellite problems. The French minister felt that the question of the cellular radiotelephone was "fairly well along" and stressed "the desire both on the German and French sides for Franco-German cooperation to be exemplary in this field."

The French minister, it will be remembered, had already come to the FRG on 7 October. At that time he had met the West German minister of research, Mr Heinz Riesenhuber, and German industrialists[1].

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1. See AFP SCIENCES No 373 of 13 October 1983, p 14.

9436
CSO: 3698/115

SCIENTIFIC AND INDUSTRIAL POLICY

FRG TO START TAX INCENTIVES, FUNDS TO PROMOTE HIGH TECH R&D

Duesseldorf HANDELSBLATT in German 3 Nov 83 p 6

> [Text] Bonn, 2 November 1983--The guiding principle of state research policy in the future should be that of promoting individual initiative in all areas of the economy. This intention was formulated by Federal Research Minister Heinz Riesenhuber on the occasion of a summary of the new research policy of the CDU-FDP coalition.

In the framework of the social market economy, industrial research, development and innovation must be a "primary task" of the enterprises. The state cannot decree innovation, but it must take part in forming the suitable attendant circumstances for research, development and innovation. "The state cannot be creative," stressed Riesenhuber. This is the task of the enterprises.

With two specific promotion programs, the minister pointed out the examples of awakening the individual initiative of the economy in the area of the key technologies microelectronics and production technology. This goal is also served by the reintroduction of special write-offs for investment in research and development beginning in 1984.

In addition to the special measures for establishing technology-oriented enterprises, it is above all a matter of improving the surrounding conditions for the reestablishment of enterprises in the realm of the technologies of the future. In this connection, Riesenhuber made note of his proposals for the provision of risk capital, indeed changing of the tax regulations for profits from transfers, the introduction of a second market for the shares of technology-oriented new companies as well as extension of the exemption of the trust-fund monies in the insurance industry.

Before the end of this year, the research minister wants to talk on this subject with experts of tax, stock and insurance law. After that, in talks with cabinet colleagues, especially the economic and finance ministers, he hopes to be able to create the prerequisites for changing the attendant circumstances. The expected changes would not be short- but only long-term, stressed the minister.

An additional focal point is to be the elimination of structural shortcomings seen, for example, in the insufficient cooperation between science and the economy. Bonn wants to continue to support improvement in the transfer of technology from large-scale research facilities to industry through the shifting of scientists from these installations into the economy by promoting the establishment of enterprises as well as by giving "technology-transfer awards."

Along these lines, Riesenhuber also included the expansion of the promotion of contract research and development for commercial enterprises by increasing the resources from DM13.8 million in 1983 to DM40 million in 1984. Riesenhuber named the assessment of technological consequences as an additional focal point of the future research policy. In the meantime, a special section was set up in the ministry for this task. With various methods, certain complexes such as gene technology or the extraction of methanol, for example, are to be studied. The complex interaction between technology, environment and society is to be systematically depicted so that in the basic decisions of research policy the opportunities and risks can be better evaluated and considered than heretofore.

In research in biological technology, the Research Ministry, in addition to the increase in support funds that has already occurred, is seeking better coordination of all research efforts, above all through improved cooperation between the economy and science.

Finally, Minister Riesenhuber reported that his ministry is now working out a new support program in the area of material research. What is needed is agreement between the state, science and the economy to work together to establish the tasks in this area and to begin the required research and development work. Riesenhuber acknowledged that it involves a "difficult process," and for that very reason it must be begun as quickly and intensively as possible.

The intention of the research minister is for direct federal project support to be progressively concentrated on basic technology, large-scale projects and those undisputed areas of state provision for the future such as safety, environmental, climate and health research.

(Chart on following page)

If an enterprise applies both the 40-percent special write-off for research and development and the linear write-off, it can obtain the greatest tax savings in the first year.

Key:

1. The special R&D write-off
2. According to proposals by the Federal Government, a 40-percent special write-off is to be permitted for investment in research and development.
3. Example: An enterprise purchases equipment valued at DM10,000 for research and development purposes. With a write-off period of 10 years, a 40-percent special R&D write-off in the first year leads--depending on the arrangement--to the following tax effects compared to previous write-off opportunities:
4. Comparison I: Write-off with constant yearly amounts (linear write-off) as opposed to a 40-percent special write-off in the first year in addition to the linear write-off
5. Comparison II: Write-off with declining annual amounts (degressive write-off) as opposed to a 40-percent special write-off in the first year in addition to the linear write-off
6. Comparison III: Write-off with declining annual amounts (degressive write-off) as opposed to a 40-percent special write-off in the first year in addition to the degressive write-off
7. Value of the entire additional tax savings at the time of acquisition
8. Tax savings in percent of the purchase price (profitability effect)
9. The examples given suppose an average tax burden of 70 percent on enterprise earnings in the write-off period and an interest rate of 8 percent.
   Source: IW calculations

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FRG MODIFIES POLICY TOWARD PROMOTING, SUBSIDIZING RESEARCH

Riesenhuber's Plan

Duesseldorf WIRTSCHAFTSWOCHE in German 11 Nov 83 p 32

[Text] With an increase of 3 percent, the research budget is growing more than the total budget. But this much is becoming clear after the end of the budget debate: This change can be carried out in the Research Ministry only step by step.

Claus Grobecker, future senator for labor and social welfare in the Hanseatic city of Bremen, today already is happy with a parliamentary farewell present to Federal Research Minister Heinz Riesehuber. During the debates on the research budget, "we managed to sneak a revenue title into his budget," the social democrat says in amusement, "and they are now going to have to try to cope with that."

In the ministry's budget draft, the title "Amounts of the German Electric Power Supply Enterprises for the Financing of the JNP-300 and THTR-300 Prototype Power Plants" originally showed up without a revenue amount. But because the federal research minister announced shortly after the elections that he had agreed with industry on its financing share, the social democrats now wanted to see money up front. Quickly, they exploited the absence of numerous members of parliament from the liberal union fraction and inserted a sum of DM200 million into the budget as a revenue item.

That remained the only point on which the SPD [Social Democratic Party of Germany] was able to prevail during the debates on the BMFT [Federal Ministry of Research and Technolgy] budget in the budget committee. The CDU [Christian Democratic Union] and the FDP [Free Democratic Party] handled the research minister's budget draft very gingerly. All in all, they struck around DM50 million from Heinz Riesenhuber's DM7.13-billion budget. Out of that amount, DM30 million were entered as general expenditure cutbacks which he himself must somehow save in his own ministry according to his own judgment. "The budget draft remained extensively unaltered," a Christian Democratic member of parliament rejoiced.

Federal Research Minister Riesenhuber was also happy. He had handled the 1983 budget as the executor of the ousted social-liberal administration. In the

1984 budget he was for the first time able to introduce his own ideas. Said social democrat Grobecker: "Looking at the 1984 budget draft, you can see that there is a different policy now being pursued in the Federal Research Ministry." And here is what that policy says: Away from direct research promotion, switch to indirect promotion. Away from application-oriented research, switch to basic research.

This turning point however becomes clear only if one looks at the budget as a whole. Riesenhuber's advocacy of indirect promotion for research projects is expressed not so much in his individual plan but rather much more so in the budget draft for the Federal Ministry of Economy and especially for the Federal Finance Ministry.

In addition to the Personnel Cost Subsidy Program (DM350 million) and the Investment Allowance Law (DM350 million), an old item was newly included in the budget for 1984: Special depreciations for investments in the research and development sector. The federal government starts with a figure of 40 percent which, according to calculations of the Institute of the German Economy, would probably improve the profitability of research investments by 7.9 percent. Riesenhuber estimates the resultant tax shortfall at DM300 million. But because this measure applies equally to large and small enterprises, it is being sharply criticized by the social democrats. "This is a Siemens Law," railed a social democratic research policy maker. "There is going to be a big pickup effect here."

When Riesenhuber wants to document the political change, he must therefore thus try to peddle other budgets. Of course, the indirect promotion share in his budget likewise goes up 45.9 percent. But the total amount is only DM272 million, or 4 percent of his total budget. The share of direct promotion in enterprises of the manufacturing industry according to statistics supplied by the BMFT remains at DM2.5 billion as it was in 1983. And the research minister admits: "That does not signify any rabid changes in direction but the tendency is recognizable." Peter Glotz, on the other hand the federal business manager of the SPD, simply cannot detect a change toward an improvement here. Riesenhuber, he maintains, does not have any new approach to offer in research policy and is only selling the old steps in new garb.

Like his predecessors, Riesenhuber had to realize that the Federal Research Ministry's budget can be diverted to a new track only step by step.

But there is one thing he had already achieved at any rate: When it came to the inclusion of new projects, Riesenhuber was able to make sure that industry would participate on the average not only with 35 percent but with an average of 57 percent. This is the only way the promotion enterprises would be forced to concern themselves also with the marketability of their research projects. So far, there was frequently a shortcoming in the transfer of technological discoveries into market practice. Even in space research, Riesenhuber wants to ask industry to come up with more cash. It is unsatisfactory, he commented recently, that Japanese industry should increasingly turn up as supplier for the American space program while "we have excellent knowhow in some sectors which however must essentially be subsidized through our budgets and which is not expressed adequately in the market."

Position of Electrical Engineering Industry

Duesseldorf VDI NACHRICHTEN in German 18 Nov 83 p 1

[Article by be.: "The Goal Is Increased Cooperation"]

> [Text] Electrical industry submits new guidelines for R&D promotion. The correction in the course of government research policy has persuaded the ZVEI (Central Association of the Electrical Engineering Industry) to review its guidelines for the promotion of research and development. In talking to VDI-Nachrichten the association's chief business manager, Professor Dr Rudolf Scheid, emphasized that the important thing was "through suitable R&D cooperation between enterprises, government, research institutes, and universities to assure the fast transfer of research results into new innovative processes and products."

On the basis of a conversation with Federal Minister of Research and Technology Dr Heinz Riesenhuber, the presidium of the ZVEI has just passed new association guidelines on the topic of research policy in which it is stated that productive effects on the entire German national economy and on development in other countries will spring from the results which are being achieved in the course of electrical industry research and development activities. The annual research expenditures of the electrical industry come to around DM8 billion; that is more than 6 percent of its sales volume.

The national economic purpose and the public interest in government research promotion, in the opinion of the ZVEI, resides in the effort to achieve innovation-promoting, productivity-raising, and environment-protecting research results sooner than they would be expected in case of purely private-industry research activities. In the association's view, there should be target-oriented division of labor between the research activity of the enterprises and that of the government on the basis of clear goals.

The electrical industry--it is stated in the guidelines--supports agencies doing basic research in the university sector in their endeavor to preserve the unity of research and theory [teaching]. Government promotion of industrial research and development projects should accordingly be concentrated above all on measures and projects of which one can expect a high level of general economic productivity increase and a strengthening of the internationl competitive position of German enterprises.

In its guidelines, the German electric industry welcomes the efforts taken by the government in recent times to achieve a commensurate relationship between the various measures of direct and indirect research promotion. Stepped-up indirect and indirectly-specific research promotion, in the opinion of the electrical industry, however should not only be brought about at the expense of direct research promotion in the industrial sector but also as the result of a concentration of project promotion as well as a priority change in the

entire government budget. Indirectly-specific promotion here, under the conditions of adequate time frames, is presumed to be a suitable additional instrument for exactly outlined promotion areas on which agreement should be achieved between government and the economy.

To the extent that government research installations carry out projects which cannot be included in basic research, this should as much as possible be done through production cooperation with industry, the guidelines continue. The requirement for making up for distortions due to competition in comparison to other industrial countries in the R&D field, in the opinion of the ZVEI, is not in contradiction to the efforts to achieve international division of labor and to form main concentration points--efforts which are meaningful for individual fields; a national economy operating on a worldwide scale, it is argued, does not need a broad R&D base in its own which is anchored in a broad interdisciplinary manner. The EC institutions should also concentrate on those projects which either go beyond the possibilities of the individual EC countries in terms of scope and cost or whose goal promises a special all-European integration effect.

Siemens Executive Comments

Duesseldorf WIRTSCHAFTSWOCHE in German 11 Nov 83 pp 34-36

[Interview with Professor Karl-Heinz Beckurts by Wolf-Dieter Michaeli: "There Is Not Enough of a Fighting Spirit"]

> [Text] In technology sectors oriented toward the future, Japan and the United States are increasingly outpacing German industry. Karl-Heinz Beckurts, board member in charge of engineering for Siemens AG [Inc.], discussed possibilities of bringing about a change here with WIRTSCHAFTSWOCHE Editor Wolf-Dieter Michaeli.

[Question] Professor Beckurts, the 1984 federal budget boils down to a change in favor of indirect research promotion. But you warned against neglecting the direct promotion instrument. Why?

Beckurts: In public discussion, our statements on direct research promotion were taken out of our memorandum in a much too one-sided fashion. We are of the opinion that the direct and the indirect instrument must exist next to each other although we also have the interesting instrument of indirectly-specific promotion.

[Question] The misinterpretation of your memorandum on research promotion however was quite obvious. At any rate, Siemens is a big enterprise and is the biggest recipient of government promotion funds.

Beckurts: For reasons of government policy we felt obligated to say something about the topic of research promotion. Siemens at any rate spends more on research and development from funds earned by itself than does any other firm in Germany and Europe. This is why we also have the duty of commenting on this topic. As for the volume of federal promotion for Siemens, we may well

be a big subsidy recipient in the context of project promotion when measured in absolute figures. But measured by in-house expenditures, Siemens will always remain below the average of the German economy. During the current fiscal year, the subsidies given by the Research Ministry, out of our total expenditures in the research and development sector, amount to between 2 and 3 percent for Siemens AG and about 7 percent for the Siemens Group. The figure is considerably higher for the economy as a whole.

[Question] Why are you then so vehemently in favor of direct promotion?

Beckurts: Because, in our opinion, it is required where we are concerned with new ways that are significant to the national economy and where the market forces are not yet or not at all active. Or in those where the international situation is characterized by tremendous distortion. Data processing is an example here. The advantage of direct promotion here resides in success control, in the possibility of judging the enterprises to be promoted in the light of their capacity, as well as the possibility of also promoting production cooperation between different firms in a goal-oriented manner. Here are the disadvantages: Danger of bureaucratization, difficult to handle for small firms.

[Question] What do you think about the planned reintroduction of special depreciations for R&D investments?

Beckurts: We welcome this measure extraordinarily. But it is only a drop in the bucket. You could not carry out effective research promotion with this instrument. One should not confine this possibility to research and promotion alone but one should extend it to the entire innovation phase.

[Question] Was the promotion effort so far effective?

Beckurts: Over the past 15 years, Siemens obtained about DM1.2 billion in direct government research promotion funds. This money, I would say, was well invested. It helped make sure that the Siemens Group is today one of the most efficient suppliers of nuclear power plants. It helped make sure that Siemens would be a manufacturer independent of the United States when it comes to the big main frame computers, a munufacturer who moreover is operating in the black in this sector. It helped us to catch up technologically in the field of microelectronics.

[Question] Technologically, perhaps--but others are running the show on this market.

Beckurts: We have here a heavily distorted competition. Microelectronics was and is being emphatically promoted in the United States through the projects of the space authority and the Defense Department. In the United States, the promotion rate in the electronics industry is about 40 percent whereas in the FRG it is only 16 percent. The Japanese, to be sure, in relation to the GNP, do not spend more money for research than we do in the FRG. But they concentrated these amounts on just a few sectors. Here is an example: The 26-K-Bit storage unit is being developed in Japan under the direction of the Japanese Post Office Company NTT and is then left to the enterprises for marketing.

It is especially in the field of microelectronics that the FRG is involved in a very regrettable scattering of forces. It seems that every West German federal state must have its own microelectronics institute as something like a status symbol.

[Question] But things are also unsatisfactory when it comes to prevailing on the market.

Beckurts: Indeed, there is a certain delay in the FRG when it comes to technology transfer processes, a certain shortcoming when it comes to eagerness to pursue innovation, and frequently there is not enough of a fighting spirit. This is, I believe, one of the two big tasks for research policy. One of the challenges we face is the reduction of international competition distortions when it comes to developing top-level technologies; the other one has to do with boosting the technology transfer mechanism and thus their broad application on the market. We ourselves are making our contribution here, for example, through our participation in a venture capital company.

[Question] What do you hope to get out of the commitment?

Beckurts: There are three main springs here. First of all, Siemens has a very high level of liquidity and wants to invest it in a profit-earning manner. Second: As a minority partner we will also get a kind of window-on-technology and we will acquire new knowledge and impetus. Third, many new jobs have been generated in the United States in recent years through the instrument of venture capital. I would say that we in Europe should also try to mitigate our employment problems through this model. I consider it unlikely that industry, with its present structure, will be in a position to solve all labor market problems of the future.

[Question] Why is Siemens only now getting into the venture market?

Beckurts: We looked for the optimum partner for a long time and we thought the whole thing out very thoroughly until we found a solution which goes far beyond the framework. Besides, it seems to me that the market in Germany appears to be really ready for this only now.

[Question] Are big enterprises sufficiently mobile in research?

Beckurts: Big enterprises have certain tasks in research which only they can perform. I would say that the development of really great basic innovations and their implementation on the market can be undertaken only by big enterprises. Here is an example: Nuclear power plants, coal refining methods, new generations in microelectronics, microelectronics-technology generations, optical communications engineering. On the other hand, there are many tasks which can be handled more efficiently by smaller enterprises. The small enterprise is more flexible and agile. The entire team is motivated toward success because everybody can really see the product. Many big enterprises therefore are trying today to launch new products with small working groups. Of course, we are also doing that here at Siemens.

[Question] Is that the only way in your opinion to make German industry once again more effective in the R&D sector?

Beckurts: It is one of many ways. Another one is to increase personnel mobility. An experiment is now being conducted, likewise with support from the federal research minister, to make it easier for qualified personnel to switch to industry from the research institutions, provided with a "return ticket" if things do not work on the outside. I myself am talking to the Association of Large-Scale Research Installations to explore possibilities for a more intensive personnel exchange.

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BRIEFS

EEC R&D COOPERATION--The European Commission has decided to stimulate European cooperation in research in all economic areas by proposing a ruling which will favor intercompany cooperation agreements, heretofore limited by the rules of free competition. The spokesman for the European Commission announced on 26 October that a ruling prepared at the instigation of the European Commissioner, Mr Frans Andriessen, will soon be submitted to review by the member states before the final decision, in 1984, of the European Commission, which has the final authority in this field. This ruling, which is in line with French requests to develop research in Europe and reduce its costs, as the European Commission points out, will allow cooperation agreements in all areas of the economy, including the development of prototypes and possibly the production of new products. However, such cooperation agreements will be forbidden to companies whose annual business is more than 500 million ecus (1 ecu = 0.86 dollar) or which involve the participation of more than one of the three leading companies in the area concerned. Finally, the European Commission will retain the right to oppose such agreements during the six months following their announcement, in order to avoid unfair competition. [Text] [Paris AFP SCIENCES in French 27 Oct 83 p 1] 8838

CSO: 3698/125

PLANNED TECHNOLOGY PARKS TO UNITE RESEARCH, INDUSTRY IN FRG

Duesseldorf WIRTSCHAFTSWOCHE in German 4 Nov 83 pp 40, 41, 44

> [Text] Skin-tight contact between college research and technology enterprises is to turn new basic research promotion centers in Aachen and Berlin and planned development parks in the State of Baden-Wuerttenberg into German breeding grounds of innovation with Silicon Valley appeal.

The basic electronics promotion researchers Hans-Joachim Kaufhold and Juergen Brauner would love to move out of their cheap domicile in a Berlin residential section today rather than tomorrow. Here is why: That which was a help in saving money 2 years ago when they started out on their own has its drawbacks: Both of them are sick and tired of working all by themselves, far from their fellow researchers. "During the start-up phase, the projects take up so much of your energy that there is practically no time left for specifically target-oriented exchange of experiences."

The two engineers hope to improve the situation by moving to the BIG (Berlin Innovation and Basic Research Promotion Center) at the Berlin Technical University which is to go into operation shortly. There, wall-to-wall with other, brand-new technology entrepreneurs, who preferably come from college, Kaufhold imagines that it would be "simpler for people to exchange information out on the grass or during lunch. Naturally," he adds, "one has to wait. At worst, a stiff competition struggle can develop in which everybody jealously guards his own know-how and goes his own ways."

But that would not be in the sense of the BIG inventors from the TU [Technical University] technology transfer agency who place great value on adequate starting points and a readiness to cooperate, also with the local colleges, as a selection criterion. Anybody who, in the former AEG [General Electric Corporation] building in the old industrial and worker section of Wedding, would like to get a share out of the total of 3,000 square meters of useful surface area and who would like to use community facilities such as the clerical support office or conference rooms, must furthermore meet the following conditions:

The enterprises should if at all possible be no older than 2 years.

They should devote themselves to the practical transfer of new technological developments.

The enterprises should have a high personnel development potential.

And their economic concept should augur success on the market.

"We want to create skilled jobs here," emphasized Heinz Fiedler, deputy director of TU-Transfer. From the R&D-oriented work areas of the enterprises that have settled in the new innovation center, the Senate--which supports the project financially--hopes to get not only "a potential job market for graduates of the Technical University and the Technical College." In the BIG it also sees the germ of a kind of Silicon Valley which also attracks young technology enterprises from the FRG.

"The most attractive environment for those who are willing to settle here," for which Economy Senator Elmar Pieroth keeps advertising, first of all consists in the proximity of the BIG to the adjoining TU institute, for example, the institutes for measurement and regulating technology, design and production engineering, food and biotechnology or microbiology. The TU installations can be used at cost; the institutes can be considered as project partners or customers while their staff members can be considered as knowledgeable conversation partners, perhaps in the common cafeteria. Hans-Joachim Kaufhold hopes to derive "big opportunities for contacts from the affiliation with the TU" which "open up additional areas of practical application beyond medicine" for his measurement and regulating technology enterprise.

The Senate however also helps enhance attractiveness with money. First of all it takes care of the conversion and improvement costs of the first phase amounting to DM2.7 million which are not being passed on to the rent. The rent is then only DM7 per square meter, a figure "in the lower range of locally customary rental fees" (Fiedler). But the enterprises themselves must foot the bill for installations specifically needed for their firms.

Second, the State of Berlin subsidizes the use of common facilities, such as the telephone and teletype service, book-keeping and cost accounting service, copiers, visual display screen text connection, and other equipment, as well as conference rooms. During the first year, basic research firms must only pay 20 percent of the costs; after that, the rates rise annually up to 100 percent during the 5th year. Then the operating plant should be fully supported from the user fees of the enterprises.

Fiedler explains this competitive advantage on the part of those who have obtained a place in the center in the light of calculation problems. "Today nobody knows how the individual service and equipment capacities, designed for maximum needs, will actually be used. There would be a danger otherwise that the users of little-used installations would be excessively overloaded."

Out of 35 serious applicants, of whom "all more or less meet the conditions for admission" (Fiedler), 20 had to be content with being put on a waiting list. "The decisive factor was the urgency of the space requirement"--for example,

in favor of Kaufhold & Brauner in whose present domicile owners, self-employed associates, and customers are almost stepping on each other's toes, and to the detriment of, let us say, the testing and measurement equipment maker B & S Elektronik who still has some space left over.

Rober GmbH [company with limited liability], a two-man outfit that came in from the FRG, needs more space; it builds industrial robots for commodity consignment handling. The enterprise wants to expand in the BIG to 14 employees on 300 square meters. The largest area, that is, 500 square meters, is taken by a chemical company which wants to explore uses for calcium silicates as asbestos substitute and as catalysts. A team, which is developing software for process data recording and control, needs only 40 square meters. The products and services of the other young enterprises extend from chrome and iron dioxide masks for making electronic structural components, conductor plate layout and manufacturing via finishing automation all the way to hydraulics and filter technology.

But the BIG newcomers have several things in common. Almost all of them want to use the opportunity for hiring additional personnel. And,"most basic researchers are scientists from the university," commented coordinator Fiedler. "When you have a two-man basic research outfit, one of the partners often has a certain degree of industrial experience. Only a single one comes directly from the classroom. Anything that has to do with production in the end can hardly be mastered by a college graduate alone."

The possibilities of cooperation with other tenants and with the college are a primary consideration with most people here, Fiedler said. "The financial advantages boil down to just dotting the i." Measurement and regulating system specialist Kaufhold has already found a customer and a conversation partner who is competent in his field at the center: A former assistant from the same university department who makes the photo masks for chip production. Kaufhold made the punched tape for the control of the plotters (EDP drafting instruments) for him.

What pleases the Berlin basic technology promoters can be almost as nice for their colleagues in Aachen. A convenience center for innovative basic research promoters, which operates in an entirely similar manner, is being established there as an offshoot of the BTT (Technology Transfer Bureau) of RWTH (Rhenish-Westphalian Technical College) and the Aachen Chamber of Industry and Commerce. By using common support capacities as well as workshop and laboratory services of the college--on a contract basis--"the in-house capital requirement of the budding young entrepreneurs is to be reduced," according to BTT Director Reinhard Roericht.

In contrast to the people in Berlin, the initiators in Aachen are relying less on the government and more on private initiative. The middle of June, a nonprofit promotion association was founded with the rather long sausage-like name of Rhenish Society for the Promotion of Innovative New Company Establishments and of Technology Transfer, Registered Association. In addition to TH [Technical College] and IHK [Chamber of Industry and Commerce], it includes the Chamber of Crafts, the city government, and Aachen Kreis, AMV (Aachen and

Munich Insurance Company), the municipal and kreis savings bank, the Aachen City Works, the Kreis Economy Promotion Society, the Bank of Aachen, the Juelich Nuclear Research Facility, and the Derichs & Konertz Construction Company. They have been summoned as "idea vehicles," recruiters of risk capital, and promoters of the budding young entrepreneurs. For a start, the members managed to collect DM 1.5 million.

The participating loan institutions hope to get improved evaluation possibilities from the new technology enterprises. The AMV feels that it has close traditional bonds with RWTH. The company, founded during the 19th century as a fire insurance company, early recognized the importance of the engineering sciences when it comes to damage prevention and with magnanimous endowments provided the decisive impetus for Aachen as a college town. The city and the kreis believe that they have an opportunity here to renew the entire regional economic structure.

The convenience center is being operated by Agit (Aachen Company for Innovation and Technology Transfer, Limited Liability), in which the City of Aachen and the Economy Promotion Society of the Kreis participate in addition to the promotion association. Agit is furthermore supposed to provide consultant services and other support services for the newly established outfits. It is also supposed to carry out applied research and development projects, and to act as agent for and developer of patents, licenses, and know-how. Roericht and Volker Hepple, director of IHK Innovation Consultants, are part-time Agit business managers. Negotiations are currently in progress on leasing an empty industrial building which is near several TH institutes and which offers a useful surface area of 3,000 square meters. A check for the conversion costs is now being expected from the State of North Rhine-Westphalia, as basically promised by Minister of Economy Reimut Jochimsen. As for the rest, the innovative mini-enterprises--not necessarily only the founders--must pay the rent and the cost-covering services at rates customary on the market. Says Roericht: "We cannot give any subsidies."

It is not only engineers with a college education who are welcome but also craftsmen, if they develop and make technically new products and processes. But of the 15 users, who are to move in by January 1984 and who were selected from about 30 applicants, only two are not from the TH "because during the first round we preferred to do our recruiting there" (Roericht). The projects extend from microcomputer hardware and software, sensors for automated production processes and motors for assembly robots via microelectronic measurement and regulating technology, equipment for biochemistry and breeding research all the way to the development of electronic structural components for glass fiber communication.

A different rule applies in the technology parks which are near the universities and which are to be established (see below) with the support of the State of Baden-Wuerttemberg in Heidelberg, Stuttgart, and Karlsruhe. They remain reserved for enterprise research and development in close contact with science. Anybody who develops prototypes ready for series-production and does not have a follow-on project must get out of the compound.

But there is a catch to this: in the software or gene and cell technology sector, for example, it is difficult to separate prototype development from special order production since the same equipment is being used for both. "Here we are going to have to figure something out," it was said in the Heidelberg City Hall which plans to put up a biotechnology and medical technology center.

Baden-Wuerttemberg Mobilizing

Baden-Wuerttemberg Prime Minister Lothar Spaeth had barely finished his speech when he was swamped with risk capital offers. Spaeth had presented the concept of a risk-capital-financed technology center on the grounds of Stuttgart University on the occasion of the IC venture Congress on 22 October in Munich. "If we had not had to leave right away, we would certainly have gotten half of the necessary capital of DM30 million together," commented Manfred Zach, director of the Section on Basic Principles in Spaeth's Ministry of State.

Twenty young enterprises, founded by college researchers, who want to develop technical product ideas to the point of production maturity, are to move into a planned new building in Stuttgart's Pfaffenwald. The emphasis is to be on the electronics and raw materials sector. The projects are being studied carefully and selected by a committee of engineers, scientists, and managers.

A risk capital fund in the form of a company with limited liability and limited partnership company is to be the center's operator. It participates with risk capital in financing the individual enterprises with up to 75 percent in each case; the founders must come up with the rest by themselves or from other sources, for example, loans. In return, the investors can deduct the start-up losses for tax purposes. The fund also takes over the building which is to be erected by the State of Baden-Wuerttemberg for an estimated DM15 million, in the form of a lease in perpetuity; it rents the rooms to the enterprises at reasonable rates thanks to the tax advantages. The university makes its facilities--for example, the large computer--available at reasonable rates.

As soon as the product is ready for series production, so that the enterprise can award a production license on it or produce it itself, but at the very latest after 4-5 years, the firm must move out again. During a period of transition, the owners must then buy the shares back or they must replace them with capital from other risk-capital finance sources or by going to the stock exchange.

The fund shares are to be sold via banks, which advance the amount, within their circle of customers. "Unfortunately, the loan institutions we approached put a damper on our joy over this," reports Zach. "But one or two of them want to get in on this." The building design is to be submitted by the end of the year if the requirements can be spelled out specifically on the basis of the applications.

Similar development parks close to universities--not only although also preferably for founders but without organized capital participation in the enterprises--have been planned in Heidelberg and Karlsruhe. The State is buying

former buildings of the Singer Sewing machine factory for around DM4 million for the benefit of the Karlsruhe Informatik-Denkfabrik. The Baden-Wuerttemberg State Credit Bank takes over the rehabilitation job and the leasing and the local chamber of industry and commerce founds a limited-liability operating company for this purpose.

The driving force behind the Heidelberg project is Lord Mayor Reinhold Zundel. He hopes to get 400-700 new jobs out of the industrial gene, biotechnology and medical technology as well as biochemistry and physics laboratories and at least as many outside, in production and sales. The city and the state, represented by the university, are to set aside 15-20 hectares in the university expansion area in Nenheimer Feld, quite close to the gene center, as construction land for the enterprises on the basis of a lease in perpetuity. The city council voted DM500,000 cash capital for the yet to be founded Technologiepark Heidelberg GmbH in July. The university gets an option for half of the capital. More than 15 interested parties, including the existing research firms of Organogen GmbH and Gen-Bio-Tec GmbH, are ready and waiting for the starting gun.

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